# Identification of tissue/cell specific marker genes and

use thereof

## **Cross References to Related Applications**

This application claims the priority of US provisional patent application 60/388994, filed June 14, 2002, the disclosure of which is incorporated herein by reference in its entirety.

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#### Field of the Invention

The present invention relates to a method for the identification of tissue cell specific marker genes, a method for the determination of a disease state or developmental status of cells/tissue as well as to gene expression profiling of cartilage tissue. More specifically, the invention relates to microarrays containing a plurality of selected human chondrocyte specific sequences and their use for classification of cartilage donor tissue or generation of characteristic gene expression profiles of *in vitro* chondrocyte cultures. Such DNA arrays find use as a standard tool of molecular biology research and clinical diagnostics for all cartilaginous or related tissues.

# Background of the invention

# Limitation on current microarray technologies

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DNA array technology, also known as biochip or microarray technology, is currently revolutionizing modern biology. In this technology, a biological sample is applied to a glass slide or chip covered with an array of immobilized DNA probes. Sample nucleic acid complementary to specific probes on the array hybridizes and can be detected with high sensitively with automated, computerized detectors. In this manner, hundreds to thousands of different individual hybridization experiments can be performed simultaneously. This allows assays of enormous complexity to be carried out — for example, an analysis of the entire gene expression

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profile of a cancer cell - with simplicity unimaginable only a few years ago. As a consequence many patents as well as scientific publications have accumulated during the last years. U.S. 6,194,158 discloses characteristic genes and gene expression useful in screening for, diagnosis of, monitoring of, and therapeutic treatment of brain cancer. U.S. 6,218,122 discloses methods for determining or monitoring the progression of disease states or the efficacy of therapeutic regimens within human patients. U.S. 6'077'673 discloses mouse arrays having a plurality of probe polynucleotides corresponding to a key mouse gene for expression analysis of critical mouse genes. A list of representative scientific papers dealing with monitoring the expression level of a large number of transcripts within a cell at any time are as follows: Schena et al., 1995, Quantitative monitoring of gene expression patterns with a complementary DNA-microarray, Science 270: 467-470; Lockhart et al., 1996, Expression monitoring by hybridization to high-density oligonucleotide arrays, Nature Biotechnology 14:1675-1680; Blanchard et al., 1996, Sequence to array: Probing the genome's secrets, Nature Biotechnology 14:1649. Qi et al., 2003, Identification of genes responsible for osteoblast differentiation from human mesodermal progenitor cells PNAS 18;100(6):3305-10. While this list of scientific papers and patents reflects without any doubt the great potential of microarrays, there are a couple of yet unsolved problems that are more and more discussed among the scientific community. Especially, these problems are data overflow, representative sample collection, RNA processing and inappropriate data analysis. It is even suspected that within next five years, many of conclusions drawn from published data will be revised or refuted. Thus there remains a real and unmet need for advanced microarray solutions, targeted to specific tissues above all with respect to simplification and substantiation of the process of data generation and data handling. With respect to this issue the disclosed invention has made considerable contribution in the cartilage area with a cartilage-specific microarray containing a manageable number of cartilage relevant genes.

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#### Limitation on the number of cartilage relevant genes

Until today the number of cartilage-relevant genes (genes that have been associated a potential functional role on cartilage biology, homeostasis or pathology) is very limited. Approximately, 100-200 genes have been described in the literature in any relationship to cartilage tissue. While existing publications e.g. Heller et al PNAS, 94; 2150-2155; 1997 have described analysis of inflammatory diseases of cartilage and Sekiya et al PNAS 99; 4397-4402; 2001 cartilage formation from stem cells with microarrays, a comprehensive analysis and determination of characteristic gene expression profiles for 2D, 3D, fetal, adult and pathological chondrocytes cell cultures cultivated under different conditions has not been performed up to now. While in patent WO01/24833 A2 a few markers have been determined that are associated with chondorcytes and their phenotype stability, it will not be possible to perform a detailed gene expression analysis and to define specific fingerprints. Therefore the possibility of characterizing culture conditions or cartilage tissue samples can not be thoroughly adressed.

Completion of the human genome first project draft on 2000 has revealed that the human genome comprises ~30000-35000 human genes. Estimates show that the number and type of active genes vary significantly between different tissues and may increase up to a couple of 10000 for complex tissues, e.g. brain. As a consequence, many genes albeit fully sequenced may have yet not been disclosed to be functionally up- or down regulated in cartilage or cartilage derived cells. The inventive approach described herein has made possible to up to now disclose a total of 467 known and additional genes being differentially expressed in a significant and objective manner within chondrocytes or chondrogenic cells.

By means of the already known and additionally found to be cartilage related genes, a strategy to best address and represent chondrocytes cultured under different conditions has been developed in the scope of the present invention.

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## **Summary of the Invention**

In a first aspect the present invention relates to a method for the identification of tissue/cell specific marker genes comprising

a) taking tissue and/or cells of at least one developmental stage and/or at least one disease state, and/or

cultivating said tissue and/or cells in vitro under at least one culture condition,

- b) determination of gene expression profiles of said tissue/cells and/or in vitro cultivated tissue/cells and
- c) identification of specific marker genes by bioinformatic analysis of said gene expression profiles.

In particular, the first aspect relates to a method for the identification of tissue/cell specific marker genes comprising cultivating tissue/cells of different developmental stages and/or health conditions *in vitro* under different culture conditions, determination of gene expression profiles of said *in vitro* cultivated cartilage tissue and identification of specific marker genes by bioinformatic analysis of said gene expression profiles.

In a preferred embodiment said tissue is selected from the group consisting of fetal tissue, adolescent tissue, adult tissue, healthy tissue, pathological tissue, progenitor cells such as stem cells or cells derived from the same precursor lineage. Preferred culture conditions are 2D and 3D *in vitro* cultures and the gene expression profiles are preferably determined by means of a micro-array. The bioinformatic analysis of said gene expression profiles is preferably done by cluster software such as e.g cluster analysis.

In a preferred embodiment said tissue is cartilage.

A second aspect of the present invention relates to a method for the determination of a disease state or developmental status of cells/tissue or the physiological potential of cells/tissue. Said method comprises establishing a profile of cellular constituents, preferably a gene expression profile, of said cells or tissue, comparison of said resulting gene expression profile with gene expression profiles characteristic for a particular status or physiological potential of the examined cells or tissue.

Said method can e.g be. used to assess the redifferentiation potential of cells or tissue, the assessment of the quality of tissue biopsies for diagnostic and prognostic purposes regarding *in vitro* tissue engineering applications, the assessment of the quality of *in vitro* produced cells such as e.g. mesenchymal cells, stem cells or embryonic cells or of *in vitro* produced tissue for therapeutical applications and for determining the effect of one or more growth factors, media compositions or drugs on cells or tissue. Based on said method it is e.g. possible to set up different *in vitro* culture conditions for cells/tissue allowing the cultivation of cells/tissue which retain their potential for differentiation.

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In a preferred embodiment said cells or tissue is cartilage tissue or chondrocytes and the array comprises polynucleotide probes of tissue specific marker genes.

In a further preferred embodiment said profile is a gene expression profile which is determined by means of a micro-array.

A further object of the present invention is a method for the determination of characteristic profils for clinical use comprising correlating the patient data of the biopsy donor with the gene expression profile of said biopsy cells/tissue. Preferably said gene expression profile has been determined according to the above disclosed method. The resulting profiles of said method are suitable tools in the clinic allowing an evaluation of further treatments of a patient.

The present invention provides characteristic gene expression profiles experimentally determined by using cartilaginous tissues as from individual human donors of various ages (fetal, adolescent, adult) and health conditions (healthy and arthritic) or cells thereof cultivated under different *in vitro* culture conditions (2D and 3D *in vitro* cultures, time follow ups). From these different gene expression profiles a set of hitherto 467 markers has been deduced that can be used to design and produce a cartilage specific microarray for commercial applications in the field of R&D, such as culture media development, drug screening etc., but also for clinical applications.

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Gene expression analysis performed with such microarrays and the corresponding analytical procedure thereof can be used to assess quality control of human donor cartilage, e.g. biopsy and therefore optimization of any downstream tissue engineering process, for diagnostic evaluation of the patient and its candidate treatment methods, to ensure a cost-optimized procedure, to investigate and assess all kind of 2D- and 3D in vitro cultures performed with human chondrocytes or chondrogenic cells, e.g. stem cells, to screen all kind of drugs, e.g. hormones, growth factors within the above mentioned in vitro cultures regarding a potential beneficial effect and quality assessment of in vitro produced tissue performed by tissue engineered procedures.

In a further aspect the present invention provides a cartilage array comprising a plurality of different polynucleotide probe spots stably associated with a solid surface of a carrier, whereby each of said spots is made of a unique polynucleotide that corresponds to one specific cartilage marker gene.

A preferred cartilage array of the present invention comprises at least two spots that have different nucleotide sequences but of the same cartilage marker gene, more preferably at least 10 spots indicative for one tissue or cell status, whereby said at least 10 spots can be selected from different sequences of one gene or from different genes or a combination thereof.

In a preferred embodiment said polynucleotides of the array do not cross hybridize under stringent conditions with each other.

In a preferred embodiment of the present invention the cartilage array comprises spots that are indicative for at least two tissue or cell status, preferably 3.

A further preferred inventive cartilage array is an array wherein at least part of the cartilage marker genes are selected from the 467 genes listed in the description, preferably at least 10 %, more preferably at least 50 %, most preferably about 100 %.

A further preferred inventive cartilage array is an array wherein at least part of the cartilage marker genes are selected from a

subgroup of the 467 genes listed in the description, wherein said subgroup consists of the most tissue specific 200 genes.

In another preferred embodiment the status is selected from biopsies and/or 2D cultures and/or 3D cultures of healthy adult, healthy fetal/infant, undesired adult, undesired fetal/infant or progenitor cells like e.g. stem cells or cells derived from the same precursor lineage.

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In a further preferred embodiment of the present invention the polynucleotide probes of the cartilage array have a length of at least 10 nucleotides, preferably at least 20 nucleotides. The probes can also have a length of 30 nucleotides, 50 nucleotides or 70 nucleotides. It is as well possible to use PCR derived products produced from cDNA clones.

In a preferred embodiment the carrier of the inventive cartilage array is attached to coated glass, nylon or any other material.

A further object of the present invention is a kit for use in a hybridization assay, wherein said kit comprises a cartilage array of the present invention. In a preferred embodiment said kit comprises reagents for generating a labelled target polynucleotide sample, a hybridization buffer and a wash medium.

### **Description of the Figures**

The present invention will be further understood from the following description with reference to the tables and figures where:

Tab.I shows the determined number of all genes in the corresponding SOM analysis being differentially expressed according to microarray analyses of a variety of *in vitro* chondrocyte cultures according to predefined criteria. From these data sets specific expression profiles can be deduced that are characterisite for different cell culture conditions.

Tab.II shows the extracted and reviewed genes deduced from Tab I in order to have only single entry numbers. Since most of these genes have never been described in any relationship to cartilage, they can be considered as novel cartilage marker (positive/negative markers) or key cartilage genes.

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Tab III shows a subset of marker genes form Tab. II that has been used for the production of a micro-array. Included is a subset from Tab II and genes known from the literature.

Tab IV shows the results of the analysis of the 467 cartilage specific marker genes.

Tab V shows the samples used in Examples 1, 2 and 3. Human chondrocytes isolated from 4 different donors were proliferated and kept in 3D-like pellet culture for 7 and 14 days resulting in a total number of 12 samples.

Fig.1 shows a classical result from an analysis performed with self-organizing-maps. This software clusters all genes together in sub clusters that show a similar expression profile. The number of marker genes for the corresponding analysis e.g. 2D vs. 3D cultures (see also Tab I) corresponds to the total number of genes in the sub clusters.

Fig 2 shows an example of a graphical presentation of a cluster analysis and viewed by the software treeview. This shows how cells from different origin and potential for *in vitro* cartilage formation are related to each other and allow a clearer classification of the cell sources. Fetal cells clearly produce different gene clusters compared to adult chondrocytes, while failures are characterized by other gene clusters. Furthermore 3D cell cultures analyzed in a time dependent manner from different donors can be distinguished among each other and gene expression profiles will be grouped accordingly.

Fig 3: SOM analysis of all culture conditions and samples described in Example 2 and in Tab V.

Fig 4: SOM analysis for proliferated chondrocytes (t0) only, for the 4 donors. Gene expression pattern corresponding to donor 2 (the second spot from left hand side in every cluster) behaves different in most clusters.

Fig 5: SOM analysis of chondrocytes kept in 3D culture condition for 7 days (t7). Gene expression pattern from donor 3 (the third spot from left hand side in every cluster) is different for example in clusters c2 and c5.

Fig 6 shows self organized maps (SOM) of chondrocytes from same patients of Figures 4 and 5 kept under 3D culture condition for 14 days (t14).

Fig 7: cluster analysis of all culture conditions and samples described in Example 2 and in Tab V. This figure shows a subset of 88 hierarchical clustered genes (rows) and samples (columns) demonstrating similar gene expression behavior of chondrocytes under different culture conditions. For example proliferated cells (#1, #2, #4, #5, #7, #8, #10, #11) can easily be discriminated from cells kept in 3D-like pellet culture for 14 days (3#, 6#, 9#, 12#).

Fig 8: cluster analysis of human aortic fibroblasts vs. chondrocytes. This figure shows a subset of selected clusters of human aortic fibroblasts cells compared to human chondrocytes both kept in 3D pellet cultures for 14 days. The dendrogram in the upper part of the figure shows the ability of CART-CHIP<sup>TM</sup> 300 microarray described in this invention to discriminate between different cell lines.

Fig 9: cluster analysis of Interleukin-1 treated vs. untreated human chondrocytes. This figure demonstrates a subset of representative gene clusters allowing differentiation between cells treated with Interleukin-1 from untreated cells both kept in 3D pellet cultures as well as for proliferated cells.

# Detailed Description of the Invention Definitions

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2D cultures as used in the scope of the present invention are anchorage dependent chondrocyte cultures cultivated on plastic culture devices.

3D cultures as used in the scope of the present invention are chondrocytes cultured in a three dimensional environment, namely either a) scaffold-free, such as small high density pellet cultures (0.25-3.0\*10<sup>6</sup> cells) or as high density cultures using 50\*10<sup>6</sup> cells/ml or aliquots thereof; or b) by using a synthetic scaffold such as PGA, PLA, or mixtures

WO 03/106706 PCT/CH03/00379

thereof or biological substances such as agarose, alginate, chitosan or collagen.

failures as used in the scope of the present invention are chondrocytes cultured in a three dimensional environment that are not able to synthesize new extracellular matrix thereby compromising the production of new living tissue engineered cartilage equivalents.

gene expression profile as used in the scope of the present invention is a profile of genes that are up or down regulated according to different cell conditions.

fingerprint as used in the scope of the present invention refers to a gene expression profile characteristic for a cellular status.

tissue or cell status as used in the scope of the present invention refers to a tissue or cells therof having a certain metabolic or activity status.

new extracellular matrix as used in the scope of the present invention designates living cartilage-like tissue.

*micro-array* as used in the scope of the present invention is used in its original scope that encompasses embodiments today sometimes refused to as "macro-arrays".

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#### The Invention

The present invention provides cartilage-specific gene arrays as well as methods for their use. In the subject cartilage arrays, a plurality of polynucleotide probe spots are stably associated with the surface of a solid carrier, preferably a surface of a microscope glass slide. Each different polynucleotide probe spot is made of a unique polynucleotide that corresponds to a key cartilage gene of interest. Thus, the subject arrays find particular use in gene expression assays of key cartilage genes. In further describing the subject of the invention, the cartilage specific microarrays are first discussed, followed by a review of representative applications in which the subject arrays may be employed.

## Arrays of the Subject Invention-General Description

#### Selection of novel key cartilage specific genes:

A critical feature of the subject arrays is that all of the probe polynucleotide spots of the array correspond to human key cartilage genes that have been found through unique selection processes and criteria. As a result of said processes, up to now 467 different key human cartilage genes that are under tight transcriptional role have been discovered, some of them being not described before in any relationship to cartilage. In more detail, different microarray analyses were performed by using cartilaginous tissues as from individual human donors of various ages (fetal, adolescent, adult) and health conditions (healthy and arthritic) or cells thereof cultivated under different *in vitro* culture conditions (2D and 3D *in vitro* cultures, time follow ups). This variety of cartilage cell sources and different culture conditions was set up to grasp the highest possible number of genes differentially expressed and thus being indicative of a potential role.

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It has been found that specific chondrocyte culture conditions are of great importance for the present invention that discloses a plurality of novel key cartilage genes as well as characteristic and meaningful gene expression patterns. For this reason, the strategy and criteria of the analysed in vitro human chondrocyte cultures are described in more detail. The principal experimental setup included both the cultivation of chondrocytes in an anchorage dependent condition, known as 2D cultures for expansion of cells e.g. where the passages is variable but at least more then one, as well as cultivation of chondrocytes in an anchorage independent condition, known as 3D cultures for (re-)differentiation and de novo tissue formation of cells. These are the key steps of any tissue engineering process where autologous tissue equivalents are produced. Since the cell source is either a small biopsy, a small bone marrow aspirate in case of mesenchymal stem cells or other tissue with a limited number of pre-chondrogenic cells, it is first necessary to isolate those cells in order to be able to multiply the cell number drastically. In case of a cartilage biopsy, cells are released from their surrounding extracellular matrix by collagenase digestion and then seeded onto the surface of plastic tissue culture flasks.

The proliferation may take place either in the presence or absence of fetal serum combined with conventional DMEM/F12 medium. Cells can then be passaged by trypsin treatment over several rounds. As a major drawback of this necessary cell expansion, the cells loose their differentiated phenotype and assume a de-differentiated phenotype with altered gene expression. It is further known that with increasing number of passages the state of dea consequence, genes being differentiation also advances. As transcriptionally upregulated under such artificial culture conditions are cartilage relevant in a manner being indicative of an undesired cellular status. It is also quite common to designate these genes as dedifferentiation or negative markers. While healthy tissue in general has been found to re-differentiate in 3D culture after up to 4 passages in 2D cultures, tissue of undesired cellular status cultivated under usual conditions, such as usual culture media, usually does not re-differentiate in 3D culture after at most 4 passages in 2D culture.

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Subculture modulated chondrocytes that do not express differentiation markers reexpress the differentiated phenotype in response to the anchorage- independence resulting from various 3D culture models, e.g. high density cultures, agarose or alginate cultures, or cultures within synthetic scaffolds such as made of polyglycolic acid (PGA), polylactic acid (PLA) or mixtures thereof. To set up three dimensional cell cultures the cells are detached after proliferation by trypsin treatment and embedded either in gel-like substances such as alginate, seeded within a porous scaffold such as PGA or cultivated as high-density cultures, only. The time for the analysis may vary and ideally addresses several time points (up to several weeks). Thus 3D in vitro chondrocyte cultures support the differentiated phenotype of chondrocytes and can be used to discover cartilage relevant genes or differentiation markers. It should be noted however, that reversibility of the de-differentiation process is dependent on the number of passages and can become irreversible or at least partially irreversible at higher passage numbers (under usual conditions at most about 4 passages). As a rule the time course of de- and re-differentiation are similar. During skeletal development, cartilage serves as a template for

WO 03/106706 PCT/CH03/00379

bone formation. Chondrocytes of fetal or infant (< 1 year) or growth plate cartilage pass through different stages and exhibit several distinct phenotypes, such as resting, proliferating, and hypertrophic chondrocytes. Progression through each of these phases is accompanied by profound changes in gene expression patterns. Further, evidence has accumulated that the successful sequence of cartilage repair via tissue engineering recapitulates aspects of embryonic tissue formation. For these reasons, it is important to consider fetal and infant cartilaginous tissue. Cells isolated from human fetal/infant cartilage that are cultivated in 2D and 3D culture systems as described above are especially helpful to understand the mechanisms underlying the phenotypic instability of chondrocytes and the related gene expression patterns. These 2D and 3D culture system may then be analyzed to deduce gene expression profiles and to define marker genes that are characteristic for the (re-)differentiation process. Thus maintenance of chondrocyte-specific phenotype being crucial for normal structure and biomechanical properties of articular cartilage may be better understood and have important implications for modern therapeutic biological applications.

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The above mentioned experimental setup for 2D and 3D cultures may be even expanded to compare human adult cells with human fetal/infant chondrocytic cells of age <1 year. The comparison of gene expression profiles of adult versus fetal/infant human chondrocytes during the *in vitro* cartilage formation process is an important aspect since marker genes associated with developmental aspects are revealed. This can be of further interest when 3D cell cultures need to be optimized for their *in vitro* performance for the production of new tissue by e.g. adding growth factors that are found to play a major role during the early onset of cartilage formation *in vivo*.

Another experimental setup found in the scope of this invention includes the *in vitro* culture of cells harvested from cartilaginous areas of arthritic knee joints. Osteoarthritis (OA) results from the failure of chondrocytes within the joint to maintain the balance between synthesis and degradation of extracellular matrix. OA is a multifactorial disorder in

which aging, genetic, hormonal and mechanical factors are all major contributors to its onset and progression. With progressing disease state, the articular chondrocytes ability to maintain homeostasis and functionality is increasingly disappearing. As a consequence, the phenotype of osteoarthritic chondrocytes compared with normal chondrocytes exhibits remarkable changes. Gene expression profiling allows characterization of the osteoarthritic cellular phenotype, a key determinant for understanding and manipulation of osteoarthritic processes. By studying and comparing the gene expression profiles of chondrocytes harvested from pathological and healthy human cartilage areas it becomes possible to identify marker genes that are able to predict the future outcome of cell cultures used for in vitro tissue engineering applications. This also relates to the very critical question of the assessment of the quality of the starting biopsy material that is being used for downstream applications like tissue engineering. By having this important information before performing any downstream applications like e.g. proliferation and consecutive 3D in vitro tissue formation, the further steps of any process can then be adapted or even not performed at all because of inadequate quality of biopsy material. Such decision may be of high relevance when tissue-engineering processes are transferred or applied in the clinic. Gene expression profiling of chondrocytes may then be used as a diagnostic tool to allow and to choose that therapeutic approach with the most promising clinical outcome.

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A further important aspect of the invention is the observation that chondrocytes derived from osteoarthritic patient material always qualify for anchorage dependent proliferation in 2D over several passages. These cells however, if subsequently induced to re-differentiate by culturing them as 3D high density pellets, do not survive over an extended time period, in most cases they die in culture by undergoing apoptosis. It is assumed that these cells, due to an altered phenotype, are not capable of producing the critical survival factors in the appropriate concentrations, above all extracellular matrix components providing intercellular spaces as they occur in native cartilage. Cells that are not suitable to be cultured within 3D high density cultures are herein referred to

WO 03/106706 PCT/CH03/00379

as "failures". These impaired cell cultures can be used to set up representative "failure" systems, where cells from different pathological cartilage sources are harvested, proliferated and cultivated in 3D high density pellet culture systems. After each of these experimental steps, RNA can be isolated from the different cell sources and combined to create "failure pools". These failure pools are very well suitable to identify general marker genes being indicative of the onset of osteoarthritis.

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For finding cartilage relevant genes, and for determining their presence dependent on the specific cartilage type such as age, health etc., sufficient material must be generated, e.g. by 2D culturing over several passages, and optionally 3D culturing. Said material then can on be subjected to usual gene analyses, and the tissue specific genes determined. Cartillage samples are classified prior to culturing and/or after culturing to get the information needed for later interpretation of the gene expression profile.

A further experimental setup of the current inventions discloses the analysis of chondrocytes grown in 3D cultures isolated from pathological human cartilage and analyzed in a time dependent manner. This experimental set-up allows to study the apoptotic process and to further define additional dynamic and characteristic gene expression profiles, useful for deducing and further assessment of the quality of the biopsy material.

The microarray process and strategy for disclosing all the cartilage relevant genes with the above-mentioned tissues and cell culture criteria will be described in the following. An important issue of the inovative strategy used by the inventors of the present inventions is to use various microarrays containing a high number of genes comprising different functional categories preferentially by representing the whole genome. The broader the microarray regarding the coverage of the human genome the more genes associated with chondrocyte cell cultures can be determined. The chosen strategy of the inventors was not obvious to a person skilled in the art.

RNA isolated from the above mentioned different cell cultures conditions may be radioactive labeled with e.g. 33P or fluorescence like e.g. Cy3 and hybridized to the corresponding filters or microarrays. After hybridization each array may then be scanned and the corresponding signals measured (Tab IV). This raw data file needs then to be calibrated and normalized in a manner to create an input file for the further downstream analysis process. In principle if the data are normalized an expression profile is created. To identify the key cartilage marker genes being differentially expressed under the chosen criteria, tedious bioinformatic analysis are conducted. Corresponding cell cultures and their expression profiles are therefore compared and analyzed accordingly and the different clusters of marker genes determined by software analysis e.g. self-organizing maps (herein referred to as SOM). A representative example of a result for the comparison of different gene expression profiles from different cell culture conditions performed by SOM analysis is given in Fig.1. By performing SOM analysis genes that are similarly expressed are clustered together in so-called sub clusters. The total amount of marker genes for one analysis corresponds to the total amount of sub clusters containing the corresponding genes. Table I in the appendix summarize the results of all the different analysis performed and encompasses all the genes determined for every set of cell culture analysis.

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By performing this analytical procedure the analysis reveals several characteristic up and down regulated marker genes for different cellular culture conditions. From these marker genes characteristic expression profiles can then be deduced and used as a benchmark for the comparison or further characterization of other cell cultures.

Hence, on the one hand previously unknown cartilagerelevant genes associated with different culture conditions and on the other
hand characteristic gene expression profiles (cellular fingerprints) indicative
of a stage of development, a disease state or a particular selected cell
culture condition are revealed. These fingerprints are part of the current
invention and are of major importance for the classification and

WO 03/106706 PCT/CH03/00379

characterization of chondrocytes cultivated under different culture conditions.

Since the gene clusters from all the different analysis contain repetitive gene entries, they have been further processed so that only single entry genes are recorded (see Tab II). This 467 selected sequences are thus all key cartilage genes that are activated and thus differentially expressed according to a stage of development, a disease state or a particular selected cell culture condition and are part of the current invention. A list of all 467 genes with their Pubmed accession no. and a description is given below See also Tables II and III):

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### List of Table II related sequences:

	List of Table II related sequences:
Pubmed Accesion No	Description
AA283693	Human osteoclast stimulating factor mRNA, complete cds
AA845156	Serine protease inhibitor, Kazal type 1
R52548	Human superoxide dismutase (SOD-1) mRNA, complete cds
T67128	ARYLAMINE N-ACETYLTRANSFERASE, MONOMORPHIC
AA845015	Elastase 1, pancreatic (elastase IIA)
AA937895	Antigen identified by monoclonal antibodies 12E7, F21 and O13
AA844998	Pancreatic polypeptide
AA844818	Amylase, alpha 2A; pancreatic
AA894557	Creatine kinase B
AA872001	Annexin VI (p68)
H09590	Human mRNA for eukaryotic initiation factor 4AI
AA868278	Testis specific protein 1 (probe H4-1 p3-1)
AA490855	Acid finger protein ZNF173
H05820	Human MRL3 mRNA for ribosomal protein L3 homologue ( MRL3 = mammalian ribosome L3 )
N57766	Agammaglobulinaemia protein-tyrosine kinase atk
AA873885	Alkaline phosphatase, liver/bone/kidney
AA878880	Interferon (gamma)-induced cell line; protein 10 from
R54818	Human eukaryotic initiation factor 2B-epsilon mRNA, partial cds
AA458630	RENIN PRECURSOR, RENAL
W37864	Phosphatase and tensin homolog (mutated in multiple advanced cancers 1)
N63192	Phenylethanolamine N-methyltransferase
R55789	Human X11 protein mRNA, partial cds
R56871	Human chromatin assembly factor-I p60 subunit mRNA, complete cds
AA448659	M-PHASE INDUCER PHOSPHATASE 2
AA235388	Tropomodulin
W37769	Chromogranin B (secretogranin 1)
AA421701	H.sapiens mRNA for MUF1 protein
N81029	Collagen, type XVIII, alpha 1
AA644128	Nuclear autoantigenic sperm protein (histone-binding)
N26536	ATPase, Cu++ transporting, beta polypeptide (Wilson disease)
AA890663	Human protein kinase PAK1 mRNA, complete cds
AA405987	Glycerol kinase 2 (testis specific)
AA888182	Ribosomal protein S4, X-linked
H09730	Adenylate kinase 2 (adk2)
AA285155	CDC46 HOMOLOG
AA873351	Ribosomal protein L35a CAMP-RESPONSE ELEMENT BINDING PROTEIN
H12320 AA856556	Ribosomal protein S28
R43581	Human guanine nucleotide-binding protein G-s, alpha subunit mRNA, partial cds
AA633768	60S RIBOSOMAL PROTEIN L24
AA496880	Ribosomal protein L5
AA490000 AA625632	Ubiquitin A-52 residue ribosomal protein fusion product 1
R40850	H.sapiens mRNA for alpha-centractin
AA486072	Small inducible cytokine A5 (RANTES)
N80129	Metallothionein 1L
T67270	UBIQUINOL-CYTOCHROME C REDUCTASE COMPLEX SUBUNIT VI REQUIRING PROTEIN
AA775364	60S RIBOSOMAL PROTEIN L30
AA464743	Ribosomal protein L21
AA663983	Triosephosphate isomerase 1
AA634008	40S RIBOSOMAL PROTEIN S23

AA683050	40S RIBOSOMAL PROTEIN S8
AA775874	60S RIBOSOMAL PROTEIN L18
AA029934	Integrin, alpha V (vitronectin receptor, alpha polypeptide, antigen CD51)
AA872397	GALECTIN-2
AA428195	Protein tyrosine phosphatase, non-receptor type 2
AA478724	Insulin-like growth factor binding protein 6
T40541	H.sapiens mRNA for human giant larvae homolog
N33214	H.sapiens mRNA for membrane-type matrix metalloproteinase 1
W69399	Homo sapiens adenosine triphosphatase mRNA, complete cds
H85454	Homo sapiens delayed-rectifier K+ channel alpha subunit (KCNS1) mRNA, complete cds
T71284	Complement component 1, q subcomponent, beta polypeptide
N95418	Human FK-506 binding protein homologue (FKBP38) mRNA, complete cds
AA430675	Human DNA repair protein XRCC9 (XRCC9) mRNA, complete cds
AA682851	Homo sapiens mRNA for ERp28 protein
AA427433	PROTEIN PHOSPHATASE PP2A, 65 KD REGULATORY SUBUNIT, ALPHA ISOFORM
AA100296	H.sapiens PAP mRNA
AA070997	Proteasome (prosome, macropain) subunit, beta type, 6
R27585	Proteasome component C2
N71628	Spi-B transcription factor (Spi-1/PU.1 related)
AA464566	Human mRNA for LDL-receptor related protein
AA043228	Calponin 3, acidic
AA478273	APEX nuclease (multifunctional DNA repair enzyme)
H05619	Homo sapiens GDNF family receptor alpha 2 (GFRalpha2) mRNA, complete cds
AA405562	Protein phosphatase 4 (formerly X), catalytic subunit
AA147043	Homo sapiens CAGH1a (CAGH1) mRNA, partial cds
AA035384	Homo sapiens mRNA for small subunit of cytochrome b in succinate dehydrogenase
D00450	complex, complete cds
R60150	Human mRNA for histidyl-tRNA synthetase (HRS)
N64051	Homo sapiens Werner syndrome gene, complete cds SPLICING FACTOR U2AF 65 KD SUBUNIT
AA405748	· · · · · · · · · · · · · · · · · · ·
AA461110 AA845167	Homo sapiens growth-arrest-specific protein (gas) mRNA, complete cds ELASTASE IIIA PRECURSOR
AA443118	Homo sapiens mRNA for CD151, complete cds
	Glycoprotein lb (platelet), beta polypeptide
N92319 AA187148	Core-binding factor, beta subunit
AA167146 AA253413	Friedreich ataxia
AA255415 AA046701	ATP SYNTHASE LIPID-BINDING PROTEIN P1 PRECURSOR
AA164562	Homo sapiens actin-related protein Arp3 (ARP3) mRNA, complete cds
AA496357	Homo sapiens SKB1Hs mRNA, complete cds
AA496357 AA180742	TUBULIN ALPHA-4 CHAIN
AA454743	Human protease M mRNA, complete cds
AA437226	Interleukin 10 receptor
AA458849	Homo sapiens placental bikunin mRNA, complete cds
AA504891	Crystallin, alpha B
AA609655	Homo sapiens mRNA for SCP-1, complete cds
AA599158	MULTIFUNCTIONAL AMINOACYL-TRNA SYNTHETASE
AA052932	Homo sapiens casein kinase I gamma 2 mRNA, complete cds
AA052932 AA789328	Homo Sapiens (clone PK2J) CDC2-related protein kinase (PISSLRE) mRNA,
	complete cds
AA129537	Human GAP SH3 binding protein mRNA, complete cds
AA486209	Low density lipoprotein-related protein-associated protein 1 (alpha-2-macroglobulin receptor-associated protein 1
H39018	H.sapiens Syt V gene (genomic and cDNA sequence)
AA464217	V-akt murine thymoma viral oncogene homolog 1

T95053 Homo sapiens Rigui (RIGUI) mRNA, complete cds
AA454646 LYMPHOTOXIN-BETA RECEPTOR PRECURSOR
Human plectin (PLEC1) mRNA, complete cds
H13691 Major histocompatibility complex, class II, DM beta
Homo sapiens RCL (Rcl) mRNA, complete cds

AA488073 Mucin 1, transmembrane

N40945 H.sapiens mRNA for DRES9 protein

Homo sapiens orexin receptor-1 mRNA, complete cds
H50114 Homo sapiens NMDA receptor mRNA, complete cds
AA452841 Human K-Cl cotransporter (hKCC1) mRNA, complete cds
W73790 IMMUNOGLOBULIN-RELATED 14.1 PROTEIN PRECURSOR

N30302 POSSIBLE GTP-BINDING PROTEIN HSR1

AA291556 Human ras inhibitor mRNA, 3' end

AA598510 Human APRT gene for adenine phosphoribosyltransferase
AA453787 Human ,TFIIB related factor hBRF (HBRF) mRNA, complete cds

H05655 Human transcriptional activator mRNA, complete cds

AA419177 INTEGRAL MEMBRANE PROTEIN E16

AA458807 Human retinal protein (HRG4) mRNA, complete cds AA293218 Cleavage stimulation factor, 3' pre-RNA, subunit 2, 64kD

W44860 Human calmodulin mRNA, complete cds

AA629862 Homo sapiens mRNA for smallest subunit of ubiquinol-cytochrome c reductase,

complete cds

AA447674 Homo sapiens HIV-Nef associated acyl CoA thioesterase (hNAACTE) mRNA,

complete cds

T52484 Nerve growth factor beta

AA496810 Protein kinase C substrate 80K-H

AA486233 G1 to S phase transition 1

AA079775 TYROSINE-PROTEIN KINASE CSK W73889 Tetranectin (plasminogen-binding protein)

R50337 Solute carrier family 19 (folate transporter), member 1 R55046 MpV17 transgene, murine homolog, glomerulosclerosis

R46821 T-COMPLEX PROTEIN 1, ALPHA SUBUNIT

R87763 Human telencephalin precursor mRNA, complete cds

H69583 Human BTG2 (BTG2) mRNA, complete cds

R56046 Guanine nucleotide binding protein (G protein), alpha z polypeptide

AA922705 Glycogen phosphorylase B (brain form)
AA487571 Surfactant, pulmonary-associated protein C
AA402440 Homo sapiens exportin t mRNA, complete cds

H29521 ATP-binding cassette 3

AA490911 Homo sapiens drp1 mRNA, complete cds

AA486082 Homo sapiens sgk gene

AA678065 2,3-bisphosphoglycerate mutase

R43509 Human Gu binding protein mRNA, partial cds

N57553 Adenosine receptor A2

AA676955 Aplysia ras-related homolog 12

R14692 Human Na/H antiporter (APNH1) mRNA, complete cds

AA488979 Homo sapiens nucleolar protein (MSP58) mRNA, complete cds

AA443630 Aldehyde dehydrogenase 8
AA027840 H.sapiens mRNA for RIT protein
AA456830 Diacylglycerol kinase, alpha (80kD)
AA453015 H.sapiens L23-related mRNA

AA074446 Human GTP cyclohydrolase I feedback regulatory protein gene, complete cds

AA027042 DNA-DIRECTED RNA POLYMERASE II 23 KD POLYPEPTIDE

AA629923 Human mRNA for pM5 protein

AA460830 Homo sapiens (clone mf.18) RNA polymerase II mRNA, complete cds

AA454218	Homo sapiens transcription factor SL1 mRNA, complete cds
AA046523	H.sapiens mRNA for centrin gene
R51346	Human eIF-2-associated p67 homolog mRNA, complete cds
AA029964	Human ataxin-2 related protein mRNA, partial cds
AA489219	DUTP pyrophosphatase
AA043133	Solute carrier family 16 (monocarboxylic acid transporters), member 1
AA812973	Human mRNA for testis-specific TCP20, complete cds
AA453471	GANGLIOSIDE GM2 ACTIVATOR PRECURSOR
AA284693	Transcription factor AP-4 (activating enhancer-binding protein 4)
N90281	Human B7 mRNA, complete cds
AA629542	Brush-1
AA679345	Human BTK region clone ftp-3 mRNA
H37774	Tuberin
T97181	Platelet factor 4
AA454879	Plasminogen activator, urokinase receptor
AA147640	Phosphorylase, glycogen; liver (Hers disease, glycogen storage disease type VI)
AA757429	Human serotonin N-acetyltransferase mRNA, complete cds
AA490991	Homo sapiens HnRNP F protein mRNA, complete cds
AA422058	H.sapiens mRNA for D1075-like gene
N66208	Human (ard-1) mRNA, complete cds
AA630776	Human AP-3 complex delta subunit mRNA, complete cds
AA827287	Human interferon-induced leucine zipper protein (IFP35) mRNA, partial cds
AA488084	Superoxide dismutase 2, mitochondrial
R89715	Protein kinase C, gamma
AA490501	H.sapiens mRNA; UV Radiation Resistance Associated Gene
N32199	Human melanoma antigen recognized by T-cells (MART-1) mRNA
AA434404	DNA primase polypeptide 2A (58kD)
N93686	Aldehyde dehydrogenase 7
AA292676	Human metargidin precursor mRNA, complete cds
AA464417	INTERFERON-INDUCIBLE PROTEIN 1-8U
AA442092	Catenin (cadherin-associated protein), beta 1 (88kD)
AA026644	Transcription factor 3 (E2A immunoglobulin enhancer binding factors E12/E47)
AA481464	Peptidylprolyl isomerase B (cyclophilin B)
T68859	Alpha-2-plasmin inhibitor (alpha-2-PI)
AA699560	Surfeit 1
AA705069	Human mRNA for receptor of retinoic acid
AA457739	Homo sapiens putative OSP like protein mRNA, partial cds
H99843	Homo sapiens mRNA for quinolinate phosphoribosyl transferase, complete cds
AA399410	Signal transducer and activator of transcription 3 (acute-phase response factor) HEAT SHOCK 70 KD PROTEIN 1
AA443039	
AA164440	Human autoantigen pericentriol material 1 (PCM-1) mRNA, complete cds Human mRNA for c-myc binding protein, complete cds
AA446453	Diacylglycerol kinase delta
AA280692	Matrix metalloproteinase 7 (matrilysin, uterine)
AA031514	Msh (Drosophila) homeo box homolog 1 (formerly homeo box 7)
R33154	· · · · · · · · · · · · · · · · · · ·
AA487452	Human DNA fragmentation factor-45 mRNA, complete cds Human gene for neurofilament subunit M (NF-M)
AA400329	Prostaglandin-endoperoxide synthase 1 (prostaglandin G/H synthase and
AA454668	cyclooxygenase)
AA486393	Cytokine receptor family II, member 4
R52541	unknown EST
AA171613	Homo sapiens carbonic anhydrase precursor (CA 12) mRNA, complete cds
AA235706	Human TATA-binding protein associated factor 30 kDa subunit (tafII30) mRNA,
	complete cds
AA668527	Human mucosal addressin cell adhesion molecule-1 (MAdCAM-1) mRNA, complete

	cds
T54144	Homo sapiens homolog of the Aspergillus nidulans sudD gene product mRNA,
	complete cds
R14080	Calcium modulating ligand
AA609599	Homo sapiens SSX3 (SSX3) mRNA, complete cds
AA489201	H.sapiens mRNA for PHAPI2b protein
R08876	Human 26S proteasome-associated pad1 homolog (POH1) mRNA, complete cds
H46425	H.sapiens Pur (pur-alpha) mRNA, complete cds
R56149	Human putative transmembrane protein (nma) mRNA, complete cds
AA454619	Homo sapiens mRNA for Hic-5, partial cds
H15445	H.sapiens mRNA for SEX gene
AA705225	Myosin, light polypeptide 4, alkali; atrial, embryonic
AA191488	Human high-affinity copper uptake protein (hCTR1) mRNA, complete cds
N64862	Human SLP-76 associated protein mRNA, complete cds
R45413	Human transmembrane 4 superfamily protein (SAS) mRNA, complete cds
R77293	Intercellular adhesion molecule 1 (CD54), human rhinovirus receptor
AA436187	Integrin, alpha M (complement component receptor 3, alpha; also known as CD11b
	(p170), macrophage antigen alpha polypeptide)
AA676470	H.sapiens IAI.3B mRNA
AA443634	Homo sapiens ubiquitin conjugating enzyme G2 (UBE2G2) mRNA, complete cds
AA664180	Glutathione peroxidase 3 (plasma)
W58658	H.sapiens mRNA for CLPP
H54023	Homo sapiens monocyte/macrophage Ig-related receptor MIR-10 (MIR cl-10) mRNA,
U70704	complete cds Cyclin-dependent kinase 6
H73724	Human neutral amino acid transporter B mRNA, complete cds
T70031 AA481758	DNAJ PROTEIN HOMOLOG 1
AA521431	Human profilin mRNA, complete cds
AA446103	ERGIC-53 PROTEIN PRECURSOR
N92646	Immunoglobulin gamma 3 (Gm marker)
AA453789	Protein-tyrosine kinase 7
AA425299	Homo sapiens ezrin-radixin-moesin binding phosphoprotein-50 mRNA, complete cds
AA868929	Troponin T1, skeletal, slow
R60019	Homolog 2 of Drosophila large discs
AA857343	Human putative RNA binding protein (RBP56) mRNA, complete cds
AA481438	Complement component 1 inhibitor (angioedema, hereditary)
AA399674	Human small proline rich protein (sprII) mRNA, clone 1292
T98887	Glucose-6-phosphatase
AA676404	Peptidylprolyl isomerase C (cyclophilin C)
H15747	Human HU-K4 mRNA, complete cds
H16958	Human glyceraldehyde 3-phosphate dehydrogenase mRNA
AA936783	Eukaryotic translation initiation factor 3 (eIF-3) p36 subunit
AA884709	Cytochrome P450 11 beta
H24688	Human SWI/SNF complex 170 KDa subunit (BAF170) mRNA, complete cds
AA884403	Human cardiotrophin-1 (CTF1) mRNA, complete cds
AA404619	5' nucleotidase (CD73)
AA598611	IMMEDIATE-EARLY RESPONSE PROTEIN NOT
H72875	GATA-binding protein 3
H63361	Eukaryotic translation initiation factor 2B (eIF-2B) alpha subunit
R39221	Human MAP kinase mRNA, complete cds
R02346	U1 snRNP 70K protein
R51835	unknown EST
R33031	H.sapiens mRNA for sigma 3B protein
AA412053	CD9 antigen
AA001897	Erythroid alpha-spectrin
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W81191	Homo sapiens nucleolar autoantigen No55 mRNA, complete cds
AA430552	Homo sapiens proline-rich Gla protein 2 (PRGP2) mRNA, complete cds
AA394130	Human transducin-like protein mRNA, complete cds
N92864	Human cleavage and polyadenylation specificity factor mRNA, complete cds
AA457123	VALYL-TRNA SYNTHETASE
R43320	Human guanine nucleotide-binding regulatory protein (Go-alpha) gene
AA670430	Glutamate receptor, metabotropic 3
H65066	Visinin-like 1
AA458785	GUANYLATE CYCLASE SOLUBLE, BETA-1 CHAIN
AA485871	H.sapiens mRNA for myosin-I beta
T39411	Human 53K isoform of Type II phosphatidylinositol-4-phosphate 5-kinase (PIPK)
DOODEE	mRNA, complete cds
R00855	Homo sapiens 59 protein mRNA, 3' end
H98666	Metallopeptidase 1 (33 kD)
H72028	GELSOLIN PRECURSOR, PLASMA
AA679177	Human follistatin-related protein precursor mRNA, complete cds
N21576	Human mitochondrial 1,25-dihydroxyvitamin D3 24-hydroxylase mRNA, complete cds
AA007419	Human RGP4 mRNA, complete cds
T49657	Homo sapiens TWIK-related acid-sensitive K+ channel (TASK) mRNA, complete cds
N38959	Homo sapiens chaperonin containing t-complex polypeptide 1, beta subunit (Cctb)
DE1010	mRNA, complete cds
R51912 H90415	Human somatostatin I gene and flanks Breast cancer 1, early onset
H41489	Adaptin, beta 1 (beta prime)
H15456	CALPAIN 1, LARGE
W45415	ELASTASE IIIB PRECURSOR
AA447751	Tyrosine hydroxylase
AA487486	Cyclin D1 (PRAD1; parathyroid adenomatosis 1)
R56604	Cholinergic receptor, nicotinic, alpha polypeptide 4
T65772	pulmonary surfactant protein (SP5)
H15085	ADP-ribosylation factor 4-like
R61295	Human ADP/ATP translocase mRNA, 3' end, clone pHAT8
T61256	H.sapiens KHK mRNA for ketohexokinase, clone pHKHK3a
AA405731	Phosphoenolpyruvate carboxykinase 1 (soluble)
T71879	Complement component C2
R59927	Human mRNA for cytochrome c oxidase subunit VIc
AA496780	Human small GTP binding protein Rab7 mRNA, complete cds
AA176688	Human mRNA for lysosomal sialoglycoprotein, complete cds
AA436163	Homo sapiens Pig12 (PIG12) mRNA, complete cds
AA428778	Human placenta LERK-2 (EPLG2) mRNA, complete cds
AA463225	Bone morphogenetic protein 4
AA485426	Interferon (alpha, beta and omega) receptor 2
W47485	Human sigma receptor mRNA, complete cds
H84982	Human checkpoint suppressor 1 mRNA, complete cds
AA504615	Homo sapiens mRNA for CAB1, complete cds
H94487	Cathepsin E
AA448959	Homo sapiens NADH:ubiquinone oxidoreductase 15 kDa IP subunit mRNA, nuclear
	gene encoding mitochondrial protein, complete cds
AA070358	Transketolase (Wernicke-Korsakoff syndrome)
AA453401	Human PH-20 homolog (LUCA2) mRNA, partial cds
N66737	Collagen, type II, alpha 1 (primary osteoarthritis, spondyloepiphyseal dysplasia,
	congenital)
AA666180	Human v-erbA related ear-2 gene
AA857131	Human Tat-SF1 mRNA, complete cds
AA479102	Protein kinase C, beta 1

AA663310

AA455640 AA496879

Thymidylate synthase

		24
Δ	A456077	Homo sapiens mRNA for p27, complete cds
	87497	H.sapiens mRNA for 2.19 gene
	A718910	Human tax1-binding protein TXBP181 mRNA, complete cds
	A406269	Nuclear factor I/X (CCAAT-binding transcription factor)
	74623	Insulin-like growth factor 2 (somatomedin A)
	99364	Human chloride channel protein (CLCN7) mRNA, partial cds
	99304 A447684	Small proline-rich protein 1B (cornifin)
	A447664 A282301	Homo sapiens nuclear dual-specificity phosphatase (SBF1) mRNA, partial cds
	99588	Human lymphoid nuclear protein (LAF-4) mRNA, complete cds
	53512	Homo sapiens alpha 2 delta calcium channel subunit isoform I mRNA, complete cds
	A683321	Homo sapiens PAR-5 mRNA, probable 5' end
	A608557	Damage-specific DNA binding protein 1 (127 kD)
	A006557 A757764	Homo sapiens mRNA for DNA-binding protein, complete cds
	A406064	Homo sapiens testis-specific Basic Protein Y 1 (BPY1) mRNA, complete cds
	54596	
	A481988	Human Krueppel-related zinc finger protein (H-plk) mRNA, complete cds Transcription factor 7 (T-cell specific)
	62394	Gap junction protein, beta 1, 32kD (connexin 32, Charcot-Marie-Tooth neuropathy, X-
IN	02394	linked)
N	26148	Zinc finger protein 148 (pHZ-52)
	A496678	B-cell CLL/lymphoma 3
	A400973	NEUTROPHIL GELATINASE-ASSOCIATED LIPOCALIN PRECURSOR
	A497027	Human mRNA, clone HH109 (screened by the monoclonal antibody of insulin
•		receptor substrate-1 (IRS-1))
Ν	64508	Homo sapiens podocalyxin-like protein mRNA, complete cds
Α	A033564	H.sapiens mRNA for DGCR6 protein
	A446108	Endoglin (Osler-Rendu-Weber syndrome 1)
	A159577	Mucin 5, subtype B, tracheobronchial
	36958	unknown EST
	A629808	Ribosomal protein L6
Α	A482067	Human tazarotene-induced gene 2 (TIG2) mRNA, complete cds
Α	A669314	ATP synthase, H+ transporting, mitochondrial F1 complex, delta subunit
Α	A775241	Aldolase A
R	73584	Homo sapiens hydroxysteroid sulfotransferase SULT2B1a (HSST2) mRNA, complete
		cds
	128984 <sub>.</sub>	PHOSPHATIDYLSERINE SYNTHASE I
R	144202	Homo sapiens catechol-O-methyltransferase (COMT) mRNA, complete cds
	V70051	H.sapiens mRNA for M-phase phosphoprotein, mpp9
	A401972	Human RalGDS-like 2 (RGL2) mRNA, partial cds
	A236164	CATHEPSIN S PRECURSOR
	122412	Platelet/endothelial cell adhesion molecule (CD31 antigen)
	A424804	MULTIDRUG RESISTANCE-ASSOCIATED PROTEIN 1
	A669443	Eukaryotic translation initiation factor 5 (eIF5)
	169689	RAS-RELATED PROTEIN RAB-1A
Н	124316	AQUAPORIN-CHIP
	A074224	Recoverin
	R36571	Human U1 snRNP-specific protein A gene
	A056465	Human 54 kDa protein mRNA, complete cds
	A633811	H.sapiens E4BP4 gene
	A457155	Human zinc-finger protein C2H2-150 mRNA, complete cds
	A459104	60S RIBOSOMAL PROTEIN L13
	140212	Human coatomer protein (HEPCOP) mRNA, complete cds
	A086476	Adenosine monophosphate deaminase 1 (isoform M)
Λ	A663310	Thymidylate synthase

Homo sapiens signalosome subunit 3 (Sgn3) mRNA, complete cds Human (clone E5.1) RNA-binding protein mRNA, complete cds

AA085749 Homo sapiens mRNA for ATP binding protein, complete cds AA425755 Homo sapiens mRNA for leukemia associated gene 1 N52350 H.sapiens mRNA for protein-tyrosine-phosphatase (tissue type: testis) AA630104 Lipase A, lysosomal acid, cholesterol esterase (Wolman disease) ALPHA-AMYLASE 2B PRECURSOR AA454854 DIHYDROPRYRIDINE-SENSITIVE L-TYPE, SKELETAL MUSCLE CALCIUM W73406 **CHANNEL GAMMA SUBUNIT** R12802 Human cytochrome bc-1 complex core protein II mRNA, complete cds AA465355 Homo sapiens mRNA for U3 snoRNP associated 55 kDa protein AA829383 DUAL SPECIFICITY MITOGEN-ACTIVATED PROTEIN KINASE KINASE 3 AA629189 Keratin 4 Homo sapiens cytoplasmic antiproteinase 3 (CAP3) mRNA, complete cds AA430512 AA456439 Human homozygous deletion target in pancreatic carcinoma (DPC4) mRNA, complete cds H27864 SECRETOGRANIN II PRECURSOR MHC class I protein HLA-A (HLA-A28,-B40, -Cw3) AA644657 Homo sapiens phosphatidylinositol 4-kinase mRNA, complete cds R40460 W96058 Human hnRNP H mRNA, complete cds T72202 Human transcription factor IL-4 Stat mRNA, complete cds AA598794 Connective tissue growth factor Ribosomal protein L27a AA599178 Adrenergic, beta, receptor kinase 1 R88247 T98612 Alpha-1 type 3 collagen Phospholipid hydroperoxide glutathione peroxidase AA454856 N67048 Type 3 iodothyronine deiodinase AA778675 Homo sapiens mRNA for calmegin, complete cds Human calmodulin dependent phosphodiesterase PDE1B1 mRNA, complete cds H51117 5-HYDROXYTRYPTAMINE 2B RECEPTOR N36174 Homo sapiens Cyr61 mRNA, complete cds AA777187 Decay accelerating factor for complement (CD55, Cromer blood group system) R09561 Human HsPex13p mRNA, complete cds R16849 **ANNEXIN XIII** AA884167 Cadherin 11 (OB-cadherin) AA136983 AA488622 Human signal transducing adaptor molecule STAM mRNA, complete cds Fructose-bisphosphatase 1 AA699427 Transcobalamin II AA490459 Human ras-related C3 botulinum toxin substrate (rac) mRNA, complete cds AA626787 N62179 Human methylmalonate semialdehyde dehydrogenase gene, complete cds N27190 UBIQUITIN CARBOXYL-TERMINAL HYDROLASE ISOZYME L3 Human glutathione-S-transferase homolog mRNA, complete cds AA441895 **FACTOR VIII INTRON 22 PROTEIN** AA463924 Homo sapiens cyclophilin-33A (CYP-33) mRNA, complete cds N78843 AA629719 Cytochrome c oxidase VIIc subunit Ankyrin 1, erythrocytic AA464755 H.sapiens sds22-like mRNA AA459351 MYOSIN LIGHT CHAIN ALKALI, SMOOTH-MUSCLE ISOFORM AA488346 Human mRNA fragment encoding beta-tubulin. (from clone D-beta-1) AA427899 H.sapiens mRNA for Gal-beta(1-3/1-4)GlcNAc alpha-2.3-sialyltransferase AA453813 AA397824 Dopachrome tautomerase (dopachrome delta-isomerase, tyrosine-related protein 2) Transforming growth factor, beta-induced, 68kD AA633901 Troponin I (skeletal fast) AA181334 Clusterin (complement lysis inhibitor; testosterone-repressed prostate message 2; AA292410 apolipoprotein J)

AA253434 HEAT SHOCK FACTOR PROTEIN 2

AA455056 H.sapiens mRNA for MAP kinase activated protein kinase

R55188	Human pre-T/NK cell associated protein (3B3) mRNA, 3' end
AA465723	Homo sapiens mRNA for protein phosphatase 2C gamma
N49856	SODIUM- AND CHLORIDE-DEPENDENT BETAINE TRANSPORTER
AA455272	H.sapiens mRNA for ITBA1 protein
AA459292	CDC28 protein kinase 1
AA878561	Ubiquitin A-52 residue ribosomal protein fusion product 1
AA772066	Human phosphatidylinositol (4,5)bisphosphate 5-phosphatase homolog mRNA,
	partial cds
N78621	H.sapiens mRNA for gamma-adaptin
AA291490	H.sapiens mRNA for processing a-glucosidase I
N46828	Homo sapiens mRNA for inositol 1,4,5-trisphosphate 3-kinase isoenzyme, partial cds
AA150487	Alkaline phosphatase, placental (Regan isozyme)
AA282537	MYOCYTE-SPECIFIC ENHANCER FACTOR 2
AA707922	Human mRNA for cone-specific cGMP phosphodiesterase gamma subunit, complete
	cds
AA443638	Homo sapiens breast cancer-specific protein 1 (BCSG1) mRNA, complete cds
W73892	Human putative tumor suppressor (LUCA15) mRNA, complete cds
N70734	Troponin T2 (cardiac)
H57136	Human phospholemman chloride channel mRNA, complete cds
AA709414	Nidogen (enactin)
W65461	Human protein tyrosine phosphatase mRNA, complete cds
AA436564	Human cellular proto-oncogene (c-mer) mRNA, complete cds
AA029042	Human hSIAH2 mRNA, complete cds
AA427725	Homo sapiens carboxypeptidase Z precursor, mRNA, complete cds
N51280	ADP-ribosylation factor like 1
AA281347	H.sapiens mRNA for MHC class I promoter binding protein
AA402960	Human HLA class III region containing NOTCH4 gene, partial sequence, homeobox
	PBX2 (HPBX) gene, receptor for advanced glycosylation end products (RAGE) gene,
	complete cds, and 6 unidentified cds
N98485	Human forkhead protein FREAC-2 mRNA, partial cds
AA490209	H.sapiens mRNA for Sop2p-like protein
W61361	Homo sapiens cytoplasmic antiproteinase 2 (CAP2) mRNA, complete cds
N51018	Biglycan
AA455281	DEFENDER AGAINST CELL DEATH 1
W69471	V-ski avian sarcoma viral oncogene homolog
AA486321	Vimentin
AA458982	Solute carrier family 9 (sodium/hydrogen exchanger), isoform 1 (antiporter, Na+/H+,
	amiloride sensitive)
AA442095	NEDD-4 PROTEIN
N99003	Active BCR-related gene
AA609284	Homo sapiens mRNA for Eph-family protein, complete cds
AA195036	Human Ro/SSA ribonucleoprotein homolog (RoRet) mRNA, complete cds
AA478268	Human CtBP mRNA, complete cds
AA608583	Homo sapiens mRNA for OTK27, complete cds
AA486435	Homo sapiens mRNA for CDEP, complete cds
AA505045	Human L2-9 transcript of unrearranged immunoglobulin V(H)5 pseudogene
AA487893	TUMOR-ASSOCIATED ANTIGEN L6
AA292226	Homo sapiens creatine transporter mRNA, complete cds
H87106	Homo sapiens T245 protein (T245) mRNA, complete cds
W96450	Human putative tRNA synthetase-like protein mRNA, complete cds
N33331	Human peroxisome proliferator activated receptor mRNA, complete cds
AA405800	Dodecenoyl-Coenzyme A delta isomerase (3,2 trans-enoyl-Coenzyme A isomerase)
T51539	Macrophage stimulating 1 (hepatocyte growth factor-like)
N59764	Human guanosine 5'-monophosphate synthase mRNA, complete cds
AA521346	H.sapiens mRNA for Ndr protein kinase
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WO 03/106706 PCT/CH03/00379 27

AA428551 Homo sapiens SOX22 protein (SOX22) mRNA, complete cds
AA489383 Bone morphogenetic protein 2
Collagen, type I, alpha-2
Human cytoskeleton associated protein (CG22) mRNA, complete cds

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Gene			£ .		Ribosomal protein L27a	Ribosomal protein L6		Cytochrome P450, subfamily IIJ (arachidonic acid	epoxygenase) polypeptide 2	mRNA, complete cds	omplete cds	Homo sapiens monocyte/macrophage Ig-related receptor	MIR-10 (MIR cl-10) mRNA, complete cds					gene product many, compiete cas		al cds						ate cds
NAME	Human prostaglandin D2 synthase gene, exon 7	Homo sapiens gene for Smad 3, exon 1, partial sequence	Homo sapiens mRNA for chondromodulin-1 precursor, complete cds	Homo sapiens mRNA for frizzled-2, complete cds	Homo sapiens gene for ribosomal proteln L27A, complete cds	Homo sapiens RPL6 gene for ribosomal protein L6, complete cds	Homo sapiens gene for SMAD4, partial cds	Homo sapiens CYP2J2 mRNA for cytochrome P450 2J2, complete cds	obe abolemon NNG-WAY OF STATE	Homo sapiens testis-specific basic Flotelli 1 (br 11) tiliniva, complete cas	Homo sapiens core binding factor alpha1 subunit (CBFA1) gene, exon 7 and complete cds	Homo sapiens monocyte/macrophage Ig-related receptor MIR-10 (MIR cl-10)	mRNA, complete cds	Homo sapiens homeodomain protein (BAPX1) mRNA, complete cds	Homo sapiens breast cancer-specific protein 1 (BCSG1) mRNA, complete cds	Homo sapiens Pig12 (PIG12) mRNA, complete cds	Homo sapiens homolog of the Aspergillus nidulans sudD gene product mRNA,	complete cds	Homo sapiens RING zinc finger protein (RZF) mRNA, complete cds	Homo sapiens macrophage inflammatory protein 1 alpha (MIP1a) mRNA, partial cds	Homo sapiens inducible nitric oxide synthase (iNOS) mRNA, complete cds	Homo sapiens frizzled 1 mRNA, complete cds	Homo sapiens bone morphogenetic protein 9 (BMP9) mRNA, complete cds	Homo sapiens group IIE secretory phospholipase A2 mRNA, complete cds	Homo sapiens syndecan 3 (SDC3) mRNA, complete cds	Homo sapiens hypoxia-inducible factor 1 alpha subunit (HIF1A) mRNA, complete cds
Accession_ NAME	mrgd M98539	AB004922	AB006000	AB017364	AB020236	AB042820	AB043547	AB080265	0000 L	Aronos/9	AF001450	AF004231		AF009801	AF010126	AF010316	AF013591		AF037204	AF043339	AF049656	AF072872	AF188285	AF189279	AF248634	AF304431

		23			
Ubiquitin A-52 residue ribosomal protein fusion product 1 3) gene, complete cds Nerve growth factor beta	9) Keratin 4 Hıman mBMA for eukanvotic initiation factor 4Al	Homo sapiens mRNA for CAB1, complete cds Human mRNA for cone-specific cGMP phosphodiesterase gamma subunit, complete cds Human cytoskeleton associated protein (CG22) mRNA,	Homo sapiens mRNA for DNA-binding protein, complete cds ARYLAMINE N-ACETYLTRANSFERASE, MONOMORPHIC Human somatostatin I gene and flanks Human profilin mRNA, complete cds Human ADP/ATP translocase mRNA, 3' end, clone pHAT8	Human cytochrome bc-1 complex core protein II mRNA, complete cds Cathepsin E Human superoxide dismutase (SOD-1) mRNA, complete cds	60S RIBOSOMAL PROTEIN L30 ete cds 60S RIBOSOMAL PROTEIN L18
Homo sapiens BCL2-associated X protein (BAX) gene, exons 1, 2 and partial cds Homo sapiens ubiquitin A-52 residue ribosomal protein fusion product 1  (UBA52), mRNA, complete cds Homo sapiens interleukin 4 (IL4) gene, complete cds Homo sapiens matrix metalloproteinase 3 (stromelysin 1, progelatinase) (MMP3) gene, complete cds Homo sapiens nerve growth factor beta (NGFB) mRNA, complete cds Homo sapiens macrophage migration inhibitory factor (MIF) mRNA, complete cds Homo sapiens osterix mRNA, complete cds	Homo sapiens mRNA for chondrocyte expressed protein 68 kDa (CEP-68 gene) Homo sapiens keratin 4 (KRT4) gene, complete cds Homo sapiens aggrecanase 1 (ADAMTS4) gene, complete cds	numan mnNA for eukaryoud mination factor 4A1 Homo sapiens mRNA for CAB1, complete cds Human mRNA for cone-specific cGMP phosphodiesterase gamma subunit, complete cds Human cytoskeleton associated protein (CG22) mRNA, complete cds	Homo sapiens mRNA for DNA-binding protein, complete cds Human mRNA for arylamine N-acetyltransferase (EC 2.3.1.5) Human somatostatin I gene and flanks Human profilin mRNA, complete cds Human ADP/ATP translocase mRNA, 3' end, clone pHAT8	Human cathepsin E mRNA, complete cds Human cathepsin E mRNA, complete cds Human supervin E mRNA, complete cds Human supervide dismutase (SOD-1) mRNA, complete cds	Human fos proto-oncogene (c-fos), complete cds Homo sapiens ribosomal protein L30 mRNA, complete cds Homo sapiens MADS/MEF2-family transcription factor (MEF2C) mRNA, complete cds Human pro-alpha1 type II collagen (COL2A1) gene exons 1-54, complete cds Homo sapiens ribosomal protein L18 (RPL18) mRNA, complete cds
AF339054 AF348700 AF395008 AF405705 AF411526 AF469046 AF469046	AJ279016 AY043326 AY044847	D38255 D38255 D45399 D49738	D49835 D90040 J00306 J03191 J03592	J04177 J04973 J05036 K00065	K00650 L05095 L08895 L10347 L11566

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Human mitochondrial 1,25-dihydroxyvitamin D3 24- hydroxylase mRNA, complete cds	Homo sapiens growth-arrest-specific protein (gas) mRNA, complete cds	Human hnRNP H mRNA, complete cds	ADP-ribosylation factor like I Homo sapiens creatine transporter mRNA, complete cds			Creatine kinase B	cl-2-alpha protein, complete cds	Vimentin	Human guanine nucleotide-binding protein G-s, alpha subunit	mHNA, partial cds	Elastase 1, pancreatic (elastase IIA)		U1 snRNP 70K protein		, and 2	Ribosomal protein S4, X-linked	Homo sapiens catechol-O-methyftransferase (COMT) mRNA, complete cds	-	Erythroid alpha-spectrin	Insulin-like growth factor binding protein 6	spo	HEAT SHOCK FACTOR PROTEIN 2	Tropomodulin
Human mitochondrial 1,25-dihydroxyvitamin D3 24-hydroxylase mRNA, complete cds Human helix-loop-helix basic phosphoprotein (G0S8) mRNA, complete cds Human focal adhesion kinase (FAK) mRNA, complete cds	Homo sapiens growth-arrest-specific protein (gas) mRNA, complete cds	Human hnRNP H mRNA, complete cds	Homo sapiens ARL1 mRNA, complete cds Homo sapiens creatine transporter mRNA, complete cds		Homo sapiens cadherin-4 mRNA, complete cds	Homo capiens collagen alpha 3 type 17 (COLSAS) IIIntrA, colliplete cus Homo capiens creatine kinase R mRNA complete cds	Human B-cell leukemia/lymphoma 2 (bcl-2) proto-oncogene mRNA encoding bcl-2-alpha protein, complete cds	Human vimentin gene, complete cds	Human guanine nucleotide-binding protein G-s, alpha subunit mRNA, partial	cds	Human pancreatic elastase IIA mRNA, complete cds	Human interleukin 3 (IL-3) mRNA, complete cds, clone pcD-SR-alpha	Human U1 small nuclear ribonucleoprotein 70 kd protein mRNA, complete cds	Human fibroblast growth factor-5 (FGF-5) mRNA, complete cds	Human parathyroid hormone-related peptide (PTHRP) gene, exons 1A, 1B, 1C, and 2	Human ribosomal protein S4 (RPS4X) isoform mRNA, complete cds	Homo sapiens catechol-O-methyltransferase (COMT) mRNA, complete cds	Human matrix Gla protein (MGP) mRNA, complete cds	Human erythroid alpha-spectrin (SPTA1) mRNA, complete cds	Human insulin-like growth factor binding protein 6 (IGFBP6) mRNA, complete cds	Human insulin-like growth factor binding protein 5 (IGFBP-5) mRNA, complete cds	Human heat shock factor 2 (HSF2) mRNA, complete cds	Homo sapiens zinc ringer protein 33 (ZNr 33) gene, exon i Human tropomodulin mRNA, complete cds
L13286 L13463 L13616	L13720	L22009	1.28997	L33930	L34059	14762	M13994	M14144	M14631		M16652	M20137	M22636	M37825	M57293	M58458	M58525	M58549	M61877	M62402	M65062	M65217	M/6/01 M77016

Human Na/H antiporter (APNH1) mRNA, complete cds Adenosine monophosphate deaminase (isoform E) GALECTIN-2 Connective tissue growth factor	H.sapiens Pur (pur-alpha) mHNA, complete cds drome) (HPRT1), mRNA	H.sapiens KHK mRNA for ketohexokinase, clone pHKHK3a Lipase A, lysosomal acid, cholesterol esterase (Wolman	Usease)  VA Transforming growth factor, beta-induced, 68kD  Troponin T2 (cardiac)  RENIN PRECURSOR, RENAL  od Decay accelerating factor for complement (CD55, Cromer blood group system)	Integrin, alpha M (complement component receptor 3, alpha; also known as CD11b (p170), macrophage antigen alpha polypeptide)	Prostaglandin-endoperoxide synthase 1 (prostaglandin G/H synthase and cyclooxygenase) 60S RIBOSOMAL PROTEIN L13 Ribosomal protein L35a 40S RIBOSOMAL PROTEIN S8 40S RIBOSOMAL PROTEIN S23 Transketolase (Wernicke-Korsakoff syndrome) Adaptin, beta 1 (beta prime)
Human Na/H antiporter (APNH1) mRNA, complete cds Human extracellular signal-regulated kinase 2 mRNA, complete cds Human AMP deaminase (AMPD3) mRNA, complete cds Human S-lac lectin L-14-II (LGALS2) mRNA, complete cds Human connective tissue growth factor, complete cds Human alpha 2 type IX collagen (COL9A2) mRNA, partial cds	H.sapiens Pur (pur-alpha) mRNA, complete cds Homo sapiens (region 7) homeobox protein (HOX7) mRNA, complete cds Homo sapiens hypoxanthine phosphoribosyltransferase 1 (Lesch-Nyhan syndrome) (HPRT1), mRNA	Homo sapiens ketohexokinase (fructokinase) (KHK), transcript variant a, mRNA Homo sapiens lipase A, lysosomal acid, cholesterol esterase (Wolman	disease) (LIPA), mHNA Homo sapiens transforming growth factor, beta-induced, 68kD (TGFBI), mRNA Homo sapiens troponin T2, cardiac (TNNT2), mRNA Homo sapiens renin (REN), mRNA Homo sapiens decay accelerating factor for complement (CD55, Cromer blood group system) (DAF), mRNA	Homo sapiens interreducing (interreducing person), the properties of (IGF1), mRNA Homo sapiens instegrin, alpha M (complement component receptor 3, alpha; Integrin, alpha also known as CD11b (p170), macrophage antigen alpha polypeptide) (ITGAM), mRNA Long conjugation (alpha polypeptide)	Homo sapiens borie garmina-carboxygnationae (9tg) protein (2000-2000). Homo sapiens prostaglandin-endoperoxide synthase 1 (prostaglandin G/H synthase and cyclooxygenase) (PTGS1), transcript variant 1, mRNA Homo sapiens ribosomal protein L13 (RPL13), transcript variant 1, mRNA Homo sapiens ribosomal protein L35a (RPL35A), mRNA Homo sapiens ribosomal protein S8 (RPS8), mRNA Homo sapiens transketolase (Wernicke-Korsakoff syndrome) (TKT), mRNA Homo sapiens adaptor-related protein complex 1, beta 1 subunit
M81768 M84489 M8721 M92934 M95610	M96684 M97676 NM_000194	NM_000221 NM_000235	NM_000358 NM_000364 NM_000537 NM_000574	NM_000618 NM_000632	NM_000962 NM_000977 NM_001012 NM_001025 NM_001064 NM_001127

AP1B1), mRNA Bone morphogenetic protein 2 transcript variant alpha, mRNA Ipha) (GRO1), mRNA rr 10 Interferon (gamma)-induced cell line; protein 10 from	Alkaline phosphatase, placental (Regan isozyme)	+ transporting, mitochondrial F1 complex, delta ATP synthase, H+ transporting, mitochondrial F1 complex, delta	Calcium modulating ligand anscript variant 1, mRNA	aipna 1 (primary osteoartnriis, spondyloepipnyseal dysplasia, corigeriila) (כסבבאו), ונמוואטוף עמוומות זי,	Eukaryotic translation initiation factor 5 (eIF5)	Guanine nucleotide binding protein (G protein), alpha z polypeptide	G1 to S phase transition 1	igen CD29 includes MDF2, MSK12) (ITGB1), mRNA	1), mRNA	8), mRNA BNA	nRNA Phosphoenolpyruvate carboxykinase 1 (soluble)	Platelet factor 4	Protein kinase C, beta 1 Recoverin
AP1B1), mRNA Homo sapiens bone morphogenetic protein 2 (BMP2), mRNA Homo sapiens caspase 9, apoptosis-related cysteine protease (CASP9), transcript variant alpha, mRNA Homo sapiens GRO1 oncogene (melanoma growth stimulating activity, alpha) (GRO1), mRNA Homo sapiens small inducible cytokine subfamily B (Cys-X-Cys), member 10 Interferon (gamma)-indu	Homo sapiens alkaline phosphatase, placental (Regan isozyme) (ALPP), mRNA	Homo sapiens ATP synthase, H+ transporting, mitochondrial F1 complex subunit (ATP5D), mRNA	phogen nodulatii 11, type	Homo sapiens collagen, type II, alpha 1 (primary osteoartinitis, spondylot mRNA	Homo sapiens cathepsin L (CTSL), mRNA Homo sapiens eukaryotic translation initiation factor 5 (EIF5), mRNA	Homo sapiens guanine nucleotide binding protein (G protein), alpha z polypeptide (GNAZ), mRNA	Homo sapiens G1 to S phase transition 1 (GSPT1), mRNA Homo sapiens hexabrachion (tenascin C. cytotactin) (HXB), mRNA	Homo sapiens nevadracino (reflacent c, cycledin), media polypeptide, antigen CD29 includes MDF2, MSK12) (ITGB1), mRNA Homo sapiens matrilin 1, cartilage matrix protein (MATN1), mRNA	Homo sapiens matrilin 3 (MATN3) precursor, mRNA Homo sapiens matrix metalloproteinase 1 (interstitial collagenase) (MMP1), mRNA	Homo sapiens matrix metalloproteinase 8 (neutrophil collagenase) (MMP8), mRNA Homo sapiens matrix metalloproteinase 13 (collagenase 3) (MMP13), mRNA	Homo sapiens phosphoenolpyruvate carboxykinase 1 (soluble) (PCK1), mRNA Phosphoenolpyruvate carboxykinase 1 (soluble) mRNA carboxykinase 1 (soluble)	Homo sapiens platelet factor 4 (PF4), mRNA	Homo sapiens parioratic polypeptide (1717), m. 133. Homo sapiens protein (in RCV1), mRNA Homo sapiens recoverin (RCV1), mRNA
NM_001200 NM_001229 NM_001511 NM_001565	NM_001632	NM_001687	NM_001718 NM_001745 NM_001797	NM_001844	NM_001912 NM_001969	NM_002073	NM_002094	NM_002213 NM_002211 NM_002379	NM_002381 NM_002421	NM_002424	NM_002591	NM_002619	NM_002738 NM_002738 NM_002903

V-ski avian sarcoma viral oncogene homolog Troponin I (skeletal fast) Visinin-like 1 IT14), mRNA a-glutamyltransferase) (TGM2), mRNA a-glutamyltransferase)	2kD type IV collagenase) (MMP9), mRNA mRNA 40 KD PEPTIDYL-PROLYL CIS-TRANS ISOMERASE CALPAIN 1, LARGE HEAT SHOCK 70 KD PROTEIN 1	eptor)-like 2 (lysosomal integral membrane protein II) (CD36L2), hrombospondin type 1 motif, 1 (ADAMTS1), mRNA Breast cancer 1, early onset	ELASTASE IIIB PRECURSOR MYOSIN LIGHT CHAIN ALKALI, SMOOTH-MUSCLE ISOFORM	physeal dysplasia, congenital) (CULZA1), transcript variant 2, Cyclin D1 (PRAD1; parathyroid adenomatosis 1)	nt 2, mRNA Type 3 iodothyronine deiodinase INA, 1473 nt] Human putative tRNA synthetase-like protein mRNA, complete cds
Homo sapiens v-ski sarcoma viral oncogene homolog (avian) (SKI), mRNA  Troponin I, skeletal, fast (TNNI2), mRNA  Homo sapiens visinin-like 1 (VSNL-1),  Homo sapiens wingless-type MMTV integration site family, member 14 (WNT14), mRNA  Homo sapiens transglutaminase 2 (C polypeptide, protein-glutamine-gamma-glutamyltransferase) (TGM2), mRNA  Homo sapiens glutathione-S-transferase like; glutathione transferase omega  Human glutathione-S-transferase like; glutathione transferase omega  cds		Homo sapiens FOS-like antigen 1 (FOSL1), mRNA Homo sapiens CD36 antigen (collagen type I receptor, thrombospondin receptor)-like 2 (lysosomal integral membrane protein II) (CD36L2), mRNA Homo sapiens talin 1 (TLN1), mRNA Homo sapiens a disintegrin-like and metalloprotease (reprolysin type) with thrombospondin type 1 motif, 1 (ADAMTS1), mRNA Homo sapiens breast cancer 1, early onset (BRCA1), transcript variant  Breast cancer 1, early onset (BRCA1), transcript variant	BHCA1-exon4, mHNA Homo sapiens elastase 3B, pancreatic (ELA3B), Mrna Homo sapiens vinculin (VCL), transcript variant meta-VCL, mRNA Homo sapiens GTP-binding protein (RHO6), mRNA Homo sapiens homeo box B6 (HOXB6), mRNA Homo sapiens myosin, light polypeptide 6, alkali, smooth muscle and non- muscle (MYL6), transcript variant 1, mRNA	Homo sapiens collagen, type II, alpha 1 (primary osteoarthritis, spondyloepiphyseal dysplasia, congenital) (CULZA1), transcript variant 2, mRNA Homo sapiens cyclin D1 (PRAD1: parathyroid adenomatosis 1) (CCND1), Cyclin D1 (PRAD1; parathyroid adenomatosis 1) mRNA	Homo sapiens vascular cell adhesion molecule 1 (VCAM1), transcript variant 2, mRNA Homo sapiens type 3 iodothyronine deiodinase mRNA, complete cds Type 3 SOX5=Sry-related HMG box gene {alternatively spliced} [human, testis, mRNA, 1473 n Human putative tRNA synthetase-like protein mRNA, complete cds comple
NM_003036 NM_003282 NM_003385 NM_003395 NM_004613 NM_004832	NM_004994 NM_004995 NM_005038 NM_005186 NM_005346	NM_005438 NM_005506 NM_006289 NM_006988 NM_007306	NM_007352 NM_014000 NM_014470 NM_018952 NM_021019	NM_033150 NM_053056	NM_080682 S79854 S83308 U07424

Human MAP kinase mRNA, complete cds Human cellular proto-oncogene (c-mer) mRNA, complete cds cds Human PH-20 homolog (LUCA2) mRNA, partial cds Acid finger protein ZNF173	Human elr-z-associated por nomolog miniva, complete cus lete cds sNA, Human TATA-binding protein associated factor 30 kDa subunit (tafll30) mRNA, complete cds Ribosomal protein L5	Major histocompatibility complex, class II, DM beta Human transcription factor IL-4 Stat mRNA, complete cds Damage-specific DNA binding protein 1 (127 kD)	Human chromatin assembly factor-I p60 subunit mRNA, complete cds ene, exon 14 and complete cds Human eukaryotic initiation factor 2B-epsilon mRNA, partial cds Human putative tumor suppressor (LUCA15) mRNA,	complete cds Human protein kinase PAK1 mRNA, complete cds Ribosomal protein L21 SODIUM- AND CHLORIDE-DEPENDENT BETAINE TRANSPORTER	Human p37NB mRNA, complete cds Human tax1-binding protein TXBP181 mRNA, complete cds Is Human cleavage and polyadenylation specificity factor mRNA, complete cds Human zinc-finger protein C2H2-150 mRNA, complete cds
Human MAP kinase mRNA, complete cds Human cellular proto-oncogene (c-mer) mRNA, complete cds Human cellular proto-oncogene (c-mer) mRNA, complete cds Human T cell leukemia LERK-2 (EPLG2) mRNA, complete cds Homo sapiens lysosomal hyaluronidase (LUCA2/HYAL2) mRNA, complete cds Human acid finger protein mRNA, complete cds Human acid finger protein mRNA, complete cds	Homo sapiens elf-2-associated p67 homolog mHNA, complete cds Human cartilage-derived morphogenetic protein 1 (CDMP-1) mRNA, complete cds Human TATA-binding protein associated factor 30 kDa subunit (tafli30) mRNA, Human TATA-binding protein associated factor 30 kDa complete cds complete cds Human ribosomal protein L5 mRNA, complete cds Ribosomal protein L5	Human ribosomal protein S9 mHNA, complete cus Human HLA-DMB mRNA, complete cds Human transcription factor IL-4 Stat mRNA, complete cds Human MDA-7 (mda-7) mRNA, complete cds Human damage-specific DNA binding protein DDBa p127 subunit (DDB1)	MHNA, complete cds Human chromatin assembly factor-I p60 subunit mRNA, complete cds Complete cds Human parathyroid hormone/PTH-related peptide receptor (PTH/PTHrP) gene, exon 14 and complete cds Human eukaryotic initiation factor 2B-epsilon mRNA, partial cds Cds Human putative tumor suppressor (LUCA15) mRNA, complete cds	Human p21-activated protein kinase (Pak1) gene, complete cds Human ribosomal protein L21 mRNA, complete cds Human pephBGT-1 betaine-GABA transporter mRNA, complete cds Human noggin (NOGGIN) gene, complete cds, (NOG)	Human pro-a2 chain of collagen type XI (COL11A2) gene, complete cds Human p37NB mRNA, complete cds Human tax1-binding protein TXBP181 mRNA, complete cds Human cleavage and polyadenylation specificity factor mRNA, complete cds Human zinc-finger protein C2H2-150 mRNA, complete cds
U07620 U08023 U09303 U09877 U09825	U13261 U13660 U13991 U14966	U14971 U15085 U16031 U16261 U18299	U20980 U22409 U23028 U23946	U24152 U25789 U27699 U31202	U32169 U33822 U37012 U38864

AQUAPORIN-CHIP	Friedreich ataxia			Human piectin (PLECT) minNA, complete cus Human neutral amino acid transporter B mBNA, complete	cds			Human osteoclast stimulating factor mRNA, complete cds			Human phospholemman chloride channel mRNA, complete	COS	Human sigma receptor mininA, compiete cus	Human Tat-SF1 mRNA, complete cds		Human high-affinity copper uptake protein (hCTR1) mRNA,	complete cds	Human Ro/SSA ribonucleoprotein homolog (RoBet) mRNA, complete cds		Homo sapiens nuclear dual-specificity phosphatase (SBF1) mRNA, partial cds					GELSOLIN PRECURSOR, PLASMA	Human mRNA for receptor of retinoic acid
Human cell surface glycoprotein CD44 mRNA, complete cds Human channel-like integral membrane protein (AQP-1) mRNA, clone AQP-1- AQUAPORIN-CHIP 1656. complete cds	Human patched homolog (PTC) mRNA, complete cds Human frataxin (FRDA) mRNA, complete cds	Homo sapiens bone morphogenetic protein-4 (hBMP-4) gene, complete cds	Human phosphatidylinositol (4,5)bisphosphate 5-phosphatase homolog mRNA, partial cds	Human plectin (PLEC1) mRNA, complete cds Human poutral amino acid transporter B mRNA, complete cds		Human H-cadherin mRNA, complete cds	Human Smad1 mRNA, complete cds		Human checkpoint suppressor 1 mRNA, complete cds	Homo sapiens integrin binding protein Del-1 (Del1) mRNA, complete cds	Human phospholemman chloride channel mRNA, complete cds		Human sigma receptor mHIVA, complete cds	Human Tat-SF1 mRNA, complete cds	Human basic helix-loop-helix DNA binding protein (TWIST) gene, complete cds	Human high-affinity copper uptake protein (hCTR1) mRNA, complete cds		Human Ro/SSA ribonucleoprotein homolog (RoRet) mRNA, complete cds	Homo sapiens mitogen activated protein kinase p38-2 mRNA, complete cds	Homo sapiens nuclear dual-specificity phosphatase (SBF1) mRNA, partial cds	Human mRNA for retinol binding protein (RBP)	Human mRNA for precursor of epidermal growth factor receptor	Human gene for tumor necrosis factor (TNF-alpha)	Human gene for L apoferritin exons 1 and 2	Human mRNA for plasma gelsolin	Human mRNA for receptor of retinoic acid
U40373 U41517	U43148 U43747	U43842	U45975	U53204	1	U59289	U59423	U63717	U68723	U70312	<b>U72245</b>		075283	U76992	U80998	U83460		U90547	U92268	U93181	X00129	X00588	X02910	X03742	X04412	X06614

X12794	Human v-erbA related ear-2 gene	Human v-erbA related ear-2 gene
X14420	Human mRNA for pro-alpha-1 type 3 collagen	
X51801	Human OP-1 mRNA for osteogenic protein	
X54412	Human mRNA for alpha1(IX) collagen (long form)	
X55654	Homo sapiens mitochondrial coxII mRNA for cytochrome C oxidase II subunit	
X55764	Human mRNA for cytochrome P-450 (11 Beta)	Cytochrome P450 11 beta
X28399	Human L2-9 transcript of unrearranged immunoglobulin V(H)5 pseudogene	Human L2-9 transcript of unrearranged immunoglobulin
X58957	H saniens atk mRNA for agammadlobulinaemia tyrosine kinase	v(r.)/J pseudogene Agammaglobulinaemia protein-tyrosine kinase atk
X60188	Human ERK1 mRNA for protein serine/threonine kinase	
X60382	H.sapiens COL10A1 gene for collagen (alpha-1 type X)	
X67337	H.sapiens HPBRII-4 mRNA	H.sapiens HPBRII-4 mRNA
X70683	H.sapiens mRNA for SOX-4 protein	
X71661	H.sapiens ERGIC-53 mRNA	ERGIC-53 PROTEIN PRECURSOR
X74795	H.sapiens P1-Cdc46 mRNA	CDC46 HOMOLOG
X76770	H.sapiens PAP mRNA	H.sapiens PAP mRNA
X78712	H.saplens mRNA for glycerol kinase testis specific 2	Glycerol kinase 2 (testis specific)
X87237	H.sapiens mRNA for processing a-glucosidase I	H.sapiens mRNA for processing a-glucosidase I
X87342	H.sapiens mRNA for human giant larvae homolog	H.sapiens mRNA for human giant larvae homolog
X92475	H.sapiens mRNA for ITBA1 protein	H.sapiens mRNA for ITBA1 protein
X94216	H.sapiens mRNA for VEGF-C protein	
XM_001306	Homo sapiens solute carrier family 16 (monocarboxylic acid transporters),	Solute carrier family 16 (monocarboxylic acid transporters),
	member 1 (SLC16A1), mRNA	member 1
XM_001316	Homo sapiens adenosine monophosphate deaminase 1 (isoform M) (AMPD1), mRNA	Adenosine monophosphate deaminase 1 (Isotorn M)
XM_001324	Homo sapiens calponin 3, acidic (CNN3), mRNA	Calponin 3, acidic
XM_001782	Homo sapiens fibromodulin (FMOD), mRNA	
XM_001826	Homo sapiens alkaline phosphatase, liver/bone/kidney (ALPL), mRNA	Alkaline phosphatase, liver/bone/kidney
XM_002321	Homo sapiens glypican 1 (GPC1), mRNA	Glypican 1
XM_003059	Homo sapiens peroxisome proliferative activated receptor, gamma (PPARG), mRNA	RNA
XM_003222	Homo sapiens catenin (cadherin-associated protein), beta 1 (88kD) (CTNNB1), mRNA	mRINA
XM_003730	Homo sapiens cytochrome c oxidase subunit VIIc (COX7C), mRNA	Cytochrome c oxidase VIIc subunit
XM_003752	Homo sapiens interleukin 3 (colony-stimulating factor, multiple) (IL3), mRNA	

Homo sapiens integrin, alpha 2 (CD49B, alpha 2 subunit of VLA-2 receptor) (ITGA2), mRNA

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Homo sapiens early growth response 1 (EGR1), mRNA XM\_004063

Homo sapiens cathepsin D (lysosomal aspartyl protease) (CTSD), mRNA XM\_006121

Homo sapiens cartilage oligomeric matrix protein (pseudoachondroplasia, epiphyseal dysplasia 1, multiple) (COMP), mRNA 9EE600\_MX

Homo sapiens leukemia inhibitory factor (cholinergic differentiation factor) (LIF), mRNA XM\_009915

Homo sapiens cathepsin K (pycnodysostosis) (CTSK), mRNA XM\_010702

Homo sapiens matrix metalloproteinase 2 (gelatinase A, 72kD gelatinase, 72kD type IV collagenase) (MMP2), mRNA XM\_012503

Homo sapiens collagen, type I, alpha 1 (COL1A1), mRNA XM\_012651

Homo sapiens chitinase 3-like 1 (cartilage glycoprotein-39) (CHI3L1), mRNA XM\_015434

Homo sapiens wingless-type MMTV integration site family, member 5A (WNT5A), mRNA XM\_016181

Homo sapiens active BCR-related gene (ABR), mRNA XM\_017096

Homo sapiens matrix metalloproteinase 7 (matrilysin, uterine) (MMP7), mRNA Matrix metalloproteinase 7 (matrilysin, uterine) Annexin VI (p68) XM\_017384

Homo sapiens annexin A6 (ANXA6), mRNA XM\_017591

Homo sapiens nuclear factor of kappa light polypeptide gene enhancer in B-cells 1 (p105) (NFKB1), mRNA Homo sapiens integrin, alpha 5 (fibronectin receptor, alpha polypeptide) (ITGA5), mRNA XM\_028204 XM\_028642

Collagen, type I, alpha-2 Homo sapiens collagen, type I, alpha 2 (COL1A2), mRNA XM\_029245

Homo sapiens frizzled-related protein (FRZB), mRNA

XM\_029796

Homo sapiens interleukin 1, alpha (IL1A), mRNA XM\_031221

Homo sapiens aggrecan 1 (chondroitin sulfate proteoglycan 1, large aggregating proteoglycan, antigen identified by monoclonal antibody 40122) (AGC1), mRNA XM\_031288

Homo sapiens interleukin 8 (IL8), mRNA XM\_031289

Homo sapiens integrin, alpha 1 (ITGA1), mRNA XM\_032902

Homo sapiens defender against cell death 1 (DAD1), mRNA XM\_033470

**DEFENDER AGAINST CELL DEATH 1** 

Homo sapiens heparan sulfate proteoglycan 2 (perlecan) (HSPG2), mRNA XM\_033657

Homo sapiens tissue inhibitor of metalloproteinase 1 (erythroid potentiating activity, collagenase inhibitor) (TIMP1), mRNA XM\_033878

Human RGP4 mRNA, complete cds Homo sapiens regulator of G-protein signalling 4 (RGS4), mRNA KM\_034023

Homo sapiens chloride channel 7 (CLCN7), mRNA XM\_034556

Homo sapiens phosphatase and tensin homolog (mutated in multiple advanced Phosphatase and tensin homolog (mutated in multiple advanced cancers 1) cancers 1) (PTEN), mRNA XM\_034845

Homo sapiens fibrillin 1 (Marfan syndrome) (FBN1), mRNA XM\_034890

Homo sapiens cathepsin B (CTSB), mRNA XM 035662

Small inducible cytokine A5 (RANTES) Homo sapiens small inducible cytokine A5 (RANTES) (SCYA5), mRNA XM\_035842

Homo sapiens integrin, beta 2 (antigen CD18 (p95), lymphocyte function-associated antigen 1; macrophage antigen 1 (mac-1) beta subunit) KM\_036107

Nuclear autoantigenic sperm protein (histone-binding)

Homo sapiens nuclear autoantigenic sperm protein (histone-binding) (NASP),

XM\_040385 XM\_042153 XM\_042664

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mRNA

	Collagen, type XVIII, alpha 1	Homo sapiens mRNA for ATP binding protein, complete cds				pphy, pseudoinflammatory) (TIMP3), mRNA	sia, autosomal sex-reversal) (SOX9), mRNA	Adrenergic, beta, receptor kinase 1	S-adenosylmethionine decarboxylase 1	Biglycan
(ITGB2), mRNA	XM_036175 Homo sapiens collagen, type XVIII, alpha 1 (COL18A1), mRNA	Homo sapiens ATP binding protein associated with cell differentiation	(APACD), mRNA	Homo sapiens msh homeo box homolog 2 (Drosophila) (MSX2), mRNA	Homo sapiens chondroadherin (CHAD), mRNA	Homo sapiens tissue inhibitor of metalloproteinase 3 (Sorsby fundus dystrophy, pseudoinflammatory) (TIMP3), mRNA	XM_039094 Homo sapiens SRY (sex determining region Y)-box 9 (campomelic dysplasia, autosomal sex-reversal) (SOX9), mRNA	Homo sapiens adrenergic, beta, receptor kinase 1 (ADRBK1), mRNA	Homo sapiens S-adenosylmethionine decarboxylase 1 (AMD1), mRNA	XM_042153 Homo sapiens biglycan (BGN), mRNA
	XM_036175	XM_037087		XM_037646	XM_037965	XM_038584	XM_039094	XM_040037	XM_040385	XM_042153

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pric dwarfism) (FGFR3), mRNA	ATPase, Cu++ transporting, beta polypeptide (Wilson disease)		ADP-ribosylation factor 4-like	Decorin
XM_04120 Homo sapiens fibroblast growth factor receptor 3 (achondroplasia, thanatophoric dwarfism) (FGFR3), mRNA	XM_045089 Homo sapiens ATPase, Cu++ transporting, beta polypeptide (Wilson disease) ATPase, Cu++ transporting, beta polypeptide (Wilson (ATP7B), mRNA	XM_045802 Homo sapiens paxillin (PXN), Mrna	XM_045890 Homo sapiens ADP-ribosylation factor 4-like (ARF4L), mRNA	XM_045925 Homo sapiens decorin (DCN), mRNA
XM_044120	XM_045089	XM_045802	XM_045890	XM_045925

XM_045926	XM_045926 Homo sapiens lumican (LUM), mRNA	0114 (2100) (machoode
XM_046035	symprocyte function-	or I'm (proof), tyripriocyte
	associated antigen 1; alpha polypeptide) (ITGAL), mRNA function-associated antigen 1; alpha polypeptide)	n 1; alpha polypeptide)
XM 046758	XM 046758 Homo sapiens tensin (TNS), mRNA	

	Thymidylate synthase		Transcription factor 7 (T-cell specific)	and metalloprotease (reprolysin type) with thrombospondin type 1 motif, 5 (aggrecanase-2) (ADAMTS5),	
	XM_046765 Homo sapiens thymidylate synthetase (TYMS), mRNA	XM_047231 Homo sapiens fibulin 1 (FBLN1), mRNA	XM_047719 Homo sapiens transcription factor 7 (T-cell specific, HMG-box) (TCF7), mRNA Transcription factor 7 (T-cell specific)	XM_047802 Homo sapiens a disintegrin-like and metalloprotease (reprolysin type) with th	mRNA
TO TOTOLINIC	XM_046765	XM_047231	XM_047719	XM_047802	

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<u>%</u> O≪			•
अव,			
skele	in 1L		:
Troponin T1, skeletal, slow	Metallothionein 11		•
ponin	allot		•
5	Met		
			•
XM_048167 Homo sapiens troponin T1, skeletal, slow (TNNT1), mRNA	XM_048201 Homo sapiens metallothionein 1L (MT1L), mRNA	XM_049177 Homo sapiens vascular endothelial growth factor B (VEGFB), mRNA	
(M_048167	KM_048201	KM_049177	
^			

Homo sapiens intercellular adhesion molecule 1 (CD54), human rhinovirus Intercellular adhesion molecule 1 (CD54), human rhinovirus receptor receptor (iCAM1), mRNA XM\_049518

Amylase, alpha 2A; pancreatic Human coatomer protein (HEPCOP) mRNA, complete cds piens) (LOC153633), mRNA	), mRNA 2 Human tazarotene-induced gene 2 (TIG2) mRNA, complete cds Human mRNA for cytochrome c oxidase subunit VIc	H.sapiens mRNA for MUF1 protein H.sapiens mRNA for RIT protein H.sapiens mRNA for PHAPI2b protein H.sapiens mRNA for Sop2p-like protein	Homo sapiens mRNA for protein phosphatase 2C gamma Homo sapiens mRNA for leukemia associated gene 1 H.sapiens mRNA for CLPP
Homo sapiens amylase, alpha 2A; pancreatic (AMY2A), mRNA  Homo sapiens coatomer protein complex, subunit alpha (COPA), mRNA  Homo sapiens colony stimulating factor 3 (granulocyte) (CSF3), mRNA  Homo sapiens insulin-like growth factor binding protein 4 (IGFBP4), mRNA  Homo sapiens lindian hedgehog homolog (Drosophila) (IHH), mRNA  Homo sapiens similar to chondroitin sulfate proteoglycan 2 (versican) (H. sapiens) (LOC153633), mRNA  Homo sapiens caspase 3, apoptosis-related cysteine protease (CASP3), mRNA  Homo sapiens fibronectin 1 (FN1), mRNA	Homo sapiens matrix metalloproteinase 12 (macrophage elastase) (MMP12), mRNA Homo sapiens retinoic acid receptor responder (tazarotene induced) 2 Human tazarotene-induced gene 2 (TIG2) mRNA, complete (RARRES2), Mrna Homo sapiens cytochrome c oxidase subunit VIc (COX6C), mRNA Homo sapiens integral membrane protein 2A (ITM2A), mRNA Homo sapiens tissue inhibitor of metalloproteinase 2 (TIMP2), mRNA	Homo sapiens MUF1 protein (MUF1), mRNA Homo sapiens collagen, type V, alpha 1 (COL5A1), mRNA Human mRNA for manganese-containing superoxide dismutase H.sapiens mRNA for RIT protein H.sapiens mRNA for PHAPI2b protein H.sapiens mRNA for Sop2p-like protein	Homo sapiens minya for with the gene Homo sapiens mRNA for protein phosphatase 2C gamma Homo sapiens mRNA for leukemia associated gene 1 H.sapiens dermatopontin mRNA, complete CDS H.sapiens mRNA for leucine zipper protein H.sapiens mRNA for CLPP
XM_049534 XM_049690 XM_049937 XM_050846 XM_053809 XM_054566 XM_054566 XM_054566	XM_058069 XM_084239 XM_084263 XM_084285 XM_085705	XM_086368 XM_096277 Y00985 Y07566 Y07570 Y08999	712692 713936 715227 222865 250781 250853

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The current invention also encompasses the process of down compression of previously determined 467 genes to a lower number that is still able to characterize the desired number of different cellular status. At present, for the determination of 7 different cell types or development stages, a minimum of 26 spots of different marker genes are preferred, much preferred about 200 such spots. For full information, at least one spot for each of the presently 467 genes (markers) is preferred. A reduction of spot number can be of relevance e.g. if under certain conditions only a small subset of those genes listed in Tab II is required for analysis e.g. in clinical applications. This down compression can be achieved by determining the ratio of actual to target number of genes and then choosing from each cluster accordingly to the determined ratio the necessary number of genes to fulfill the requirement. This process requires to group the number of genes for each analysis of e.g. Tab. I into representative cluster familys from where representative genes can be selected. Such clusters familys can be determined as shown in Figure 1, namely by grouping clusters together that show a similar expression pattern. For each cluster family a representative number of genes may be choosen according to the compression factor that has been defined. It can easily be seen that for larger clusters like e.g. "A" in Tab I more genes are available to select while in other clusters like e.g. "E" in Tab I less are present. At the end of the process one needs to balance the procedure in order to preserve the characteristics of the expression profile. In order to do so the amount of genes for each analysis should at least be greater than 2 sequences or spots, respectively, of different genes and for the total array at least 30. In order to control such a process classical hierarchical clustering (Stanford) analysis can be performed and checked on graphical presentations like treeview (Stanford). Cluster analysis may group similar expression profiles in families and will allow distinguishing between different 30 cell sources and allows classification of these cell cultures (see Fig. 2). If the cell sources are not properly represented in the cluster analysis it means that the selected marker genes are not balanced.

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### Example of an cartilage specific micro array structure:

To produce a microarray with printed oligonucleotides sequences of approx. at least 10 mers, peferably at least 25 mers, some sequences of table II need to be further processed. Since some of the determined sequences in Tab II are only expressed sequence tags (herein referred to as EST), they do not correspond to or represent the full-length cDNA. Therefore the EST preferably is BLAST searched with the public database at NCBI and the corresponding full-length cDNA determined. Only by having the correct and full-length cDNA it is possible to design oligomeric sequences that are balanced to each other and minimize any cross reactivity. Exemplary polynucleotide sequences (targets) are provided in the sequence listing of Table III. The cartilage related polynucleotide sequences as e.g. listed in Table III and other polynucleotide sequences known as key cartilage genes from the literature can be immobilized on a substrate and used as hybridizable array elements in a microarray format. Such microarrays can be composed of a subset of oligonucleotides representing e.g. sequences listed on Tab. II but modified to represent only full-length cDNA sequences. The used polynucleotides for the production of such a microarray can either be 50mer or also PCR (polymerase chain reaction) products but at least need to be longer then 10 bases. It should be noted that for microarray production also PCR products from the corresponding determined sequences directly or the full length cDNA can be used and it is not restricted just to oligonucleotides.

Methods to anchor such oligonucleotides or polynucleotides on a solid support are described in literature, together with information on length dependent distances between each oligo or polynucleotides and spots . (see e.g. Principal and Practice, DNA microarrays: gene expression analysis B.Jordan, Springer, 2001)

When polynucleotides are employed as hybridizable array elements in a microarray and depending on the software used, the array elements may be organized in an ordered fashion so that each element is present at a specified location on the substrate. If the array elements are at specified locations on the substrate, the hybridization patterns and

intensities (which together create a unique expression profile) can be interpreted in terms of expression levels of particular genes. This expression profile can then be used and may be correlated with any effect associated with a tissue and/or compound or to be investigated with regard to a specific tissue and/or compound and allows comparison with already existing data.

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One of such useful application of using ordered polynucleotides on microarrays is e.g. the comparison of gene expression profiles from a new sample e.g. a tissue biopsy, with already determined characteristic gene expression profiles that are preferably stored in a database. Such stored gene expression profiles are e.g. of major importance if microarrays are applied in the clinic. In this case advantageously a database is set up that stores the corresponding gene expression profiles and advantageously also all patient informations, e.g. history, blood pressure etc. By including all patient data and gene expression profiles in the analysis process and then starting a comparison with an expression profile from a new biopsy, it becomes possible to achieve a stronger correlation with the clinical outcome. This will allow to determine which therapy shall be applied, or even to modify an existing therapy, e.g. to add growth factor x at a concentration y during the ex vivo tissue engineering phase. It may also be the case that the biopsy sample will demonstrate a poor gene expression profile that precludes the successful application of a modern therapeutic cell/tissue approach. Such cases would then only qualify for traditional surgical approaches, and hence would not obtain the benefits of the tissue engineering process.

In analogy, the assessment of *in vitro* produced cartilage can also be performed. In the same way as mentioned above cell culture parameters, like e.g. culture media conditions, growth factor concentration, are preferably stored in a data base together with the corresponding gene expression profiles. Comparison of the database entry with new profiles of new samples can then be used to assess the quality of the new *in vitro* produced tissue.

### Subject Arrays and their use:

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It should be noted that the invention described here is not dependent on any special array format rather than the possibility to select from an extended list of 467 novel key cartilage genes as well as meaningful gene expression patterns. A presently preferred subject array is a novel cartilage specific microarray that includes 187 genes that in the scope of this invention have been determined to be cartilage related and 140 genes that have been connected to cartilage in literature (see also Tab III). Normally, in highdensity array procedures up to 10000 genes are usually applied and are not specific for certain applications. As one major general drawback, this results in massive data overflow and impaired data analysis due to difficult data handling and procedures. A preferred array has in its current state a minimal number of 150 genes, presently much preferred at most 333 genes, all of those with demonstrated relevance within cartilage tissue. Another major limitation has become apparent. While the invention WO01/24833 A2 describes a few marker genes associated with cartilage phenotype stability they do not allo w to extensively describe chondrocyte cultures in details. No comprehensive classification of the different cell populations and culture conditions is possible as well as no gene expression profile or fingerprint can be achieved. Gene expression profiles determined with a set of genes represented in Tab II may allow to perform a more comprehensive analysis of different cell cultures conditions. Furthermore it may allow to compare and classify different tissue or the result of the different applied cell culture conditions. The above mentioned topics may only be possible with the disclosed invention as outlined within the following applications.

The inventive array CART-CHIP 300 <sup>™</sup> may be applied to classify (quality control) any source material, such as human cartilage biopsies, mesenchymal stem cell containing bone marrow aspirate, or prechondrogenic cells containing tissue according to pre-defined categories with respect to their capacity to re-build or re-organize a hyaline cartilage-like matrix *in vitro*. A rough subdivision could be for example "A", "B", or "C". While "A" will easily produce cartilage-like matrix, "B" will require special treatment to achieve an implantable construct, and "C" will represent those

cases that do yet not qualify for such a procedure. This biopsy classification system will allow:

• Quality control of the starting biopsy material and therefore optimization of the downstream process regarding e.g. in vitro tissue engineering applications

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- Diagnostic evaluation of the patient and candidate treatment methods (e.g. CARTIGRAFT™) to ensure a cost-optimized procedure
  - Quality control of in vitro tissue engineered products

The subject array of the present invention can be employed for all kind of research and developmental studies related to *in vitro* tissue engineering of cartilage. The possibility to assess proliferation, differentiation or re-differentiation as well as de novo matrix formation processes through analyses and comparison of a plurality of key cartilage genes (positive/negative markers) within one single experiment replaces current trial and error approaches and is thus far more rational.

The subject array can be applied to screen all kind of drugs, e.g. hormones, growth factors, within *in vitro* chondrocyte cultures regarding a potential beneficial effect on proliferation, differentiation, de novo matrix formation. The deduced expression profiles can then be compared with existing data of e.g. native cartilage tissue and used to further optimize the process. Additionally the expression profiles can be compared with data from human adult and human infant cartilage to deduce a pathway or a strategy of how to induce more tissue formation in vitro.

The subject array of the preferred embodiment is very well suitable to better understand reaction pathways leading to new responses of chondrocytes *in vitro*. Only key cartilage genes comprising the whole spectrum of functional gene categories are to be investigated. This can be used to study the complexity of degenerative cartilage process *in vitro* and the respective influence of potential beneficial drugs.

The subject array may be used to optimize cultures for in vitro cartilage formation starting from human cell sources other than cartilage like e.g. mesenchymal stem cells or bon marrow aspirates.

This subject array will be preferably used as powerful alternative for conventional molecular biology tools beside more established histological and biochemical analyses. By focusing on the most prominent cartilage marker genes being either positive or negative, it is possible to characterize cartilage or cartilage related tissues as well as cell cultures thereof. In this respect, the subject array can replace conventional RT-PCR studies performed to check for cartilage marker gene expression, e.g. collagen I versus collagen II, aggrecan versus versican. By applying this subject array the set of markers will be easily increased by simultaneously simplifying the experimental procedure and enhancing the outcome.

The subject arrays of the present invention have several advantages compared to existing microarrays as well as to conventional gene expression tools such as RT-PCR, Northern Blots etc.

Most importantly, the subject arrays are all based on key cartilage genes. Beyond all the key cartilage genes known from the literature (~100-200 genes), 467 additional cartilage relevant genes have been discovered. Thus a significantly increased pool of cartilage key genes exists to choose from for various applications. For instance, to understand degenerative processes as they occur in OA or RA by study of complex biological reaction pathways, it is important to follow expression of a relatively large number of genes.

### **Examples**

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The examples are described for the purposes of illustration and are not intended to limit the scope of the invention.

## Example 1: Analysis of various human cartilage samples

Useful for characterizing chondrocyte cultures derived from different human cartilage samples (adult and fetal), where adult samples are different with respect to their capacity to form living tissue engineered equivalents under high density culture conditions.

Adult chondrocytes show different gene expression clusters compared to fetal chondrocytes and can be further distinguished from samples that will not produce living cartilage constructs (failures).

Human chondrocytes from adult and fetal articular cartilage were proliferated in DMEM-F12 medium containing 10% FCS over several passages and transferred to pellet cultures (0.5\*10<sup>6</sup> cells) in serum free DMEM-F12 medium supplemented with Ascorbate and Insulin medium. Proliferated cells were directly lyzed with RLT buffer (RNeasy<sup>®</sup> Mini Kit, Qiagen) after trypsin release from plastic substrate, shredded (QIAshredder, Qiagen) and kept frozen at -80°C in lysis buffer for later processing. High density pellet cultures were cultivated for 2 weeks if not otherwise specified, subsequently washed with phosphate buffered saline (PBS) and lyzed in RLT Buffer (supplied with RNeasy<sup>®</sup> Kit). Total RNA was isolated from all samples as described in the manual provided with the RNeasy kit and stored at -80°C.

Fluorescent labeled aRNA (amplified RNA) constructs were obtained by *in vitro* reverse transcription of the RNA followed by an *in vitro* amplification reaction.

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2 μg of isolated total RNA were used per sample to amplify RNA by applying only one cycle of in vitro transcription (IVT, Millenium Biologix AG, Application Note).

2 μg of total RNA from each sample was primed with oligo(dT)<sub>24-mer</sub> (containing a T7 RNA Polymerase Promotor) and reverse transcribed using 400 Units SuperScript II reverse transcriptase enzyme, nucleotides, 5x Reaction Buffer and Dithiothreithol (DTT) as described in protocol provided with the enzyme. For ribonuclease protection 1 μL RNase inhibitor (10 Units) was used to prevent RNA degradation during first strand synthesis. This first strand synthesis reaction was incubated for 1 hour at 42°C.

To the first strand synthesis reaction 93  $\mu$ l nuclease free water, 30  $\mu$ l second strand buffer (Invitrogen, Basel, Switzerland) and 1.5  $\mu$ l nuclotide mix (dATP, dTTP, dGTP, dCTP, 25 mM each) was added.

Second strand synthesis reaction mix was obtained by adding 40 Units E. coli polymerase I (New England Biolabs, BioConcept, Allschwil, Switzerland), 10 Units E. coli DNA Ligase (New England Biolabs, BioConcept, Allschwil, Switzerland) and 2.5 Units Ribonuclease H (Fermentas, Labforce AG, Nunningen, Switzerland). Reaction was incubated for 2 hours at 16°C.

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After this incubation step remaining RNA was degraded by adding 7.5  $\mu$ l 1M sodium hydroxid containing 2mM EDTA (Ethylenediaminetetraacetic acid) for 10 minutes at 65°C. 7.5  $\mu$ l 1M Hydrochloric acid was added to neutralize the reaction.

The obtained double strand DNA was purified in a QIAquick® PCR purification kit (Qiagen, Hilden, Germany) and concentrated to 7.5 μl. To this concentrated RNA following reagents were added to obtain aRNA synthesis mix: 2 μl ATP (Adenosine triphosphate, 75mM), 2 μl GTP (Cytidin triphosphate, 75mM), 2 μl GTP (Guanosin triphosphate, 75mM), 2 μl UTP (Uridin triphosphate, 75mM), 1.5 μl 5-(3-aminoallyl)-Uridin triphosphate and 2 μl reaction buffer and 2 μl Enzyme mix (both provided with Ambion MegaScript Kit, Ambion, Cambridgeshire, United Kingdom).

This aRNA synthesis mix was incubated for 4 hours at 37°C. Remaining double strand DNA was digested by adding 1 µl Dnase I for 15 min at 37°C. aRNA was cleaned and concentrated with an RNeasy® Mini Kit column (Qiagen, Hilden Germany) and then concentrated to a final volume of 9 µl.

Fluorescent dye molecules were coupled to the reactive aminoallyl groups of the incorporated a 5-(3-aminoallyl)-Uridin triphosphate molecules. One aliquot of either Cy3<sup>TM</sup>- or Cy5<sup>TM</sup>-mono reactive dye (Amersham Biosciences, Buckinghamshire, United Kingdom) was diluted in 40 µl water free Dimethyl sulfonoxide. 10 µl of one of the diluted Cy<sup>TM</sup> mono reactive dyes was added to each sample buffered in 100mM Carbonate

buffer (pH 9.00). Reaction was quenched after 1 hour by adding 10.4  $\mu$ l Ethanol amine for 15 min at room temperature.

Unincorporated dye molecules were removed by ethanol precipitation. 2 µl Glycogen (Invitrogen, Basel, Switzerland) was added as carrier during precipitation. After precipitation aRNA pellet was washed with 80% ethanol, dried and resuspended in 50 µl 1x Fragmentation buffer (200mM Tris(hydroxymethyl)aminomethane hydrochloride, 500 mM Potassium acetate, 150mM Magnesium acetate). aRNA was fragmented for 35 min at 94°C and placed on ice immediately. Fragmented aRNA was dissolved in 900 µl hybridization buffer.

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For denaturation aRNA was incubated for 5 min at 98°C and centrifuged for 30 sec at full speed in a microcentrifuge.

One CART-CHIPTM 300 (Millenium Biologix AG, Switzerland) was placed face down in a standard hybridization chamber. Hybridization solution containing the denatured and labeled aRNA sample was injected using a standard micropipet whereas Cy3<sup>TM</sup> and Cy5<sup>TM</sup> samples were hybridized together in one hybridization chamber (Millenium Biologix AG, Switzerland). The microarrays were incubated overnight at 42°C in a PCR thermal cycler (TGradient, Whatman Biometra GmbH, Göttingen, Germany).

After incubation unspecific aRNA probe was washed away with 1xSSC, 0.1%SDS for 5 min at room temperature, followd by another wash step in 1x SSC, 0.1% SDS for 5 min and rinsed with 1xSSC without SDS for 1 minute to remove excessive SDS. 1xSSC was discarded. Remaining 1xSSC buffer on the slide surface was removed by centrifuge the slide for 2 min at 1500 x g.

The dried CART-CHIP™ 300 were then scanned using an Affymetrix 418 microarray scanner.

Expression level raw data for every spot was obtained with ImageQuaNT (Molecular Dynamics). Raw data was normalized by dividing every expression value by total expression value of all spots for every sample and filtered by setting all values below the 25 percentile to the value of this 25 percentile to remove noise (25 percentile threshold).

For each sample (e.g. de-differentiated and re-differentiated chondorcytes) a list of all measured genes was generated. This so called gene expression profile was then used for subsequent analyses.

Further data analysis was performed using either hierarchical clustering with cluster.exe (written by Michael Eisen, Stanford University) or Self Organizing Maps (SOM), such as GeneCluster developed by Whitehead Institute (Massachusetts Institute of Technology, MIT). The settings of the software were optimized until a reasonable number of clusters resulted that were able to represent the comparison thoroughly. In the following example the parameters were as following:

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Basic parameters: SOM rows 6; SOM col:4; #epochs=3000; #seeds=1

Advanced parameters: initialization: random vectors; neighborhood: bubble; alpha l=2; alpha f=0.005; sigma l=3000; sigma f=2.

Fig 1 shows a typical result from a SOM analysis with the above mentioned basic parameters, whereas Fig 2 shows an example of a graphical presentation of a cluster analysis and viewed by the software treeview.

# Example 2: Quality Control and Human Cartilage Sample Classification

Useful to demonstrate how CART-CHIP™ 300 can be used to differentiate between diverse cell culture conditions, to distinguish different patients, to study the influence of 3D culture conditions and to serve as a quality control tool during any tissue engineering process.

Human chondrocytes isolated from 4 different donors were proliferated over one passage (P1) and then cultivated as high density pellets (0.5\*10<sup>6</sup> cells) in 3D culture for 7 and 14 days. RNA samples were taken from proliferated as well as from 3D cultured cells resulting in totally 12 different samples as shown in Figure 8. RNA isolated from this samples was shreddered in a QIAshredder (QIAGEN, Hilden, Germany), amplified, hybridized, washed and scanned as described in Example 1.

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Data sets for all 12 samples were extracted and normalized as described in Example 1 to perform cluster and SOM analysis as noted below. Cluster analysis was performed using normalized data computed with GeneCluster.

Fig 3 shows a picture of such a cluster analysis for all 12 samples (#1-#12) consisting of 20 clusters (c0-c19)

Every cluster represents a typical gene expression pattern for all 12 samples indicated by a point, starting from sample #1 on the left hand side to sample #12 on the right hand side in every cluster. For example cluster c0 represents the expression level of 104 genes in all 12 samples in a given range indicated by the lines located above and below the computed points.

Another example for gene expression levels that behave similar for different culture conditions and donors are depicted in clusters c3, c4, c9 and c10. Meaning that every subset of the three donor specific points #1-#3, #4-#6, #7-#9, #10-#12 (see Tab V for detailed description) have gene clusters that behave similar in all analyzed samples.

An example of differently behaving genes is indicated in cluster c13, representing 10 genes that behave similar in donor #1 and #2 but show a different gene expression patterns for donors #3 and #4.

More detailed analyses are shown in Fig 4, Fig 5, and Fig 6. The clusters produced in these figures clearly demonstrate differences as well as similarities in cell behavior for either t0, t7 or t14 days, respectively.

Another software algorithm that can be applied for analysis of large amounts of data coming from gene microarrays is called hierarchical cluster analysis, whereas genes and/or different conditions with similar behavior in gene expression are clustered together. All hierarchical cluster analyses were performed using Cluster software described in Eisen et al. (1998) PNAS 95:14863) and displayed using treeview.exe developed by same author.

Fig 7 shows such a cluster of selected genes for all 12 samples analyzed. Every square is representing one single gene

WO 03/106706 PCT/CH03/00379 51

expression value. Different intensity means different expression levels. Dark squares are representing samples without any significant change in gene expression compare to the other samples or patients. Bright squares are indicating samples in which genes are up- or down-regulated relative to other samples analyzed. A so called cluster of genes is a group of genes that behave similar from one donor to the other donors.

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Not only genes but also samples can be clustered together. These clusters are called similarity dendrograms, shown in the top part of Fig 7. These tree-like structures illustrates similarities in gene expression between different samples or donors. The closer a sample (#1...#12) is located to another sample in this dendrogram the more similar gene pattern they have.

Interestingly to see is that the seven samples located at the right side of the dendrogram (samples #1, #2, #5, #7, #8, #10 and #11) are clustered together. This samples are representing to and t7 conditions as described above (illustrated in Tab V), whereas a cluster of 4 samples in the middle of the dendrogram (samples #3, #6, #9 and #12) are representing only t14 samples. This means a microarray of the current invention is able to distinguish between de-differentiated, proliferated samples (t0 and t7) and re-differentiated samples in a later stage (t14).

An outlier represents sample #4 located at the most left side of Fig 7. which represents proliferated chondrocytes (t0) from donor 2 and could not clustered together with the remaining proliferated samples. Interestingly, this sample that it is not similar to all other proliferated samples (#1, #7 and #10) was impaired with its capacity to form cartilage tissue equivalents following expandation in 2D culture. The biochemical analysis revealed a lower amount of total collagen/DNA for this sample and immunohistochemisty with collagen II antibodies resulted in only weak staining for a collagen II.

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### Example 3: Aortic Fibroblasts vs. Chondrocytes

Example to differentiate between expanded chondrocytes and aortic fibroblasts cultivated over 14 days in 3D settings.

A human aortic fibroblast cell source was proliferated and brought to 3D culture. RNA was isolated after 14 days of culture. Expression data analysis was performed as described in previous Examples 1 and 2 using CART-CHIP™ 300 microarray.

A hierarchical cluster analysis was performed as described in example 2. Samples representing 3D culture after 14 days (t14) were included in said data analysis (samples #3, # 6, # 9 and #12, see Tab V).

The result of the described analysis can be seen in Fig 8. The upper part of the figure shows a dendrogram as described in example 2. Aortic fibroblasts are not clustered together with human chondrocytes. The cluster shows a significantly different pattern compared to all other cultures.

Obviously a gene expression pattern of an aortic fibroblast cell source can be clearly separated from a gene expression pattern of human chondrocytes. A micorarray of the present invention is therefore not only able to study differences between different chondrocyte culture conditions but also to distinguish between cells isolated from different tissues.

### Example 4: Arthritic conditions vs. healthy conditions

Useful to distinguish between normal healthy chondrocyte behavior from cells resembling an arthritic phenotype. Interleukin- $1\beta$  is known to play a central role in the inflammation and connective tissue destruction observed in both rheumatoid arthritis (RA) and osteoarthitis (OA). Stimulation of *in vitro* chondrocyte cultures with Interleukin- $1\beta$  thus represents a simple experimental arthritis model.

The chondrocyte cell source from donor 4 (see Tab V) was proliferated over 3 passages and then cultivated as high-density pellet cultures (0.5\*10<sup>6</sup> cells) for 16 hours and 7 days either in the absence or presence of Interleukin-1β (30 ng/mL). RNA was isolated from all samples,

WO 03/106706 PCT/CH03/00379 53

hybridized to CART-CHIP™ 300 and expression profiles were generated as described in Example 1.

A hierarchical cluster analysis was performed as described in Example 1 and the dendrogram and a selection of the representative gene clusters are shown in Fig 9. This clearly shows that already a short stimulus of Interleukin-1 $\beta$  results in alteration of the chondrocyte phenotype with gene expression changes that can be distinguished from untreated normal chondrocyte cultures.

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## <u>Appendix</u>

Table I

Experiment and correlated gene	Number of marker genes for	experiment
expression analysis	each experiment (analysis)	(analysis)
2D marker adult vs. fetal/infant	151	Α
2D /3D adult vs. fetal/infant	96	В
3D marker failure	165	С
3D marker adult/fetal/infant	350	D
2D/3D marker adult	48	E
Time dependent failure marker	75	F
3D failure marker	41	G
Apoptosis related failure markers	30	Н

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### Table V

Sample Nu	mbers (#)		
	Proliferation	7 days in 3D culture	14 days in 3D culture
	(t0)	(t7)	(t14)
Donor 1	#1	#2	#3
Donor 2	#4	#5	#6
Donor 3	#7	#8	#9
Donor 4	#10	#11	#12

Table IV shows the results of a bioinformatic analysis of gene expression profiles of the 467 cartilage specific marker genes.

																					_	_																											
H3 F P4 17d	5.224212686	5.129921131	0.455256887	15,92056233	23,77610407	23,03713043	0.687222458	6,960856259	1,451946868	1,313345062	9,888630279	4,869119618	4,040992653	8.569006814	18.21899443	31,75585388	17,65353573	5,693624857	10,18586889	5.811360752	5.163746261	3,905915697	1,720941975	6.724601997	3,55803538	8,961263558	8,676253864	6.694763747	B,395745244	4.663694738	0.622524146	8.452850767	0.963761651	8.218265778	6,209684883	0.899376594	0.757004021	0.780826029	0.413540500	1.144875198	1.212402438	1.69499	0.619590829	2,072056795	1.445787697	1.159935914	2.050690418	1.948529432	3.8118/0062
H3 F P4 t2d	0.213829818	1.018759368	26.82422658	0.266372201	3.113814791	0.332861119	8.48774821	47.44855774	46.47247102	63,31563058	6.765-02	5.585056007	4.626992228	0.227069034	1,505490705	1,86211811	0.493477278	0.148018732	10.66742278	6.453757844	6,303850434	3,178401276	9.899533942	9.131700385	3.719920625	10.83208914	7.214242967	7.19394857	9,801034583	5.481627936	7,73405205	10.38278845	0.217171058	10.27180594	7.379800537	0.408343693	0.219791049	0.271477848	0.450001185	0.601192682	0,501308175	0.274386994	0,169003657	1.299858757	9.69E-02	1.02782629	1.026193827	0.6724641	8,32E-02
H3 F P4 10d	0.143513725	1,332668422	27,50011778	0.263409159	4,459497525	1,004544129	11,6741356	42,93573187	39.11417155	53.73423923	0,132045049	5.897415558	4.163992221	0,577197042	1.945055757	2,300286033	0.487069801	0.478785814	13.79679438	5.197874289	5.489587577	3,916307321	8.798222752	8.26544815	5,188848193	10.44168598	9.009982779	8.667406893	8.326957952	6.091759705	10,14275452	9,717748938	0,742540888	11.24128172	7.402395869	0.326537695	0.205188914	0.471456936	190044/50	0.951794529	0.502539979	0.498447008	0.141276114	1.714315274	3,53E-02	0.971529338	1.215371395	0.548390406	2.135989003
H2 P1 2D	0.257739798	1.859400083	22.01795031	0.194757907	6.266907187	1.524476899	10.804701	49,39056409	60.33602671	67,24659793	0.287251416	3,658833325	3.291155604	0.853117504	0.696379763	0.351548888	0,413262131	0.57824012	5.824480196	1,980885808	2.110133253	3,164509514	7.13865299	3,524896196	4.797167927	6,782587093	5.630305124	7.051304119	5,21033759	3,336342818	5.830896283	6.423478204	0.620362547	6.251078878	5.184975167	0,500876851	0,103345305	0.857904175	0.818248288	0.393352577	0.514470842	0,695569959	0,380406218	0,712197565	0.173871475	1.676363321	1,428674622	0,916034948	1.323849484
H2 P1 3D	0.447391374	1,041642418	25,57074708	0.122945522	4.218022136	1,34894881	8,673344954	54.89200718	65.92881949	62,45668946	0.559410558	2.03670347	2.11287386	0.443767203	1,160409378	0.484042151	0,580037834	0,325728665	6,048695063	1,511275797	1.5903832	9.701220707	5.327868949	2.740282482	3,365604514	4.717147657	4,634853853	9.079241362	5,57092524	2,539664871	3,645361823	3,870971862	1.080891115	3.698744788	6.365619531	0.79673277	1.197723988	1,29264139	1,931094763	0.633670185	0.653312475	1.681720166	1.362523305	3,538640747	0,364964803	1,747487433	1.060601139	1.123344154	1,007887654
Ht V2 14d	0.322383183	1,384248489	18.34158303	1,158151225	3,845471328	1,498136505	4.163473688	40,56594843	49,4951755	65,42329615	1,521400852	1.564621676	2,402406359	0,884601448	0.860155011	1.364947624	1,655155015	0.199952191	4,33841323	1,262910319	1,558423149	2.226165523	5.095438247	2.837008591	1.810297945	2.976028459	3,344552795	3,601513562	3.391349693	2.083996724	0.735677843	2.747874952	10,31208553	2,426058114	3,688749895	7.979382806	7.275988896	8,510141689	6,064087362	5.606806863	6.056796145	10,68487135	4.967702878	12,43527006	10.27394074	9,031533244	7.115065643	6.709648146	5.16313531
H1 V2 12d	7.005-02	1.863140939	23,2864338	3.43E-02	6,563146942	0,364695951	9.619376872	54.52879325	44,42230199	64.75076884	0.390597399	6.432026011	7,480509788	0.2218924	1.029762957	0.747123688	0.751859199	0,409947934	11,58519602	4,089689479	4.106218227	7,877144785	9,565581925	8.062945347	7.128779744	9,806778833	11.20923244	11,46996906	10.68939675	6.963834008	8.389833107	12.021725	1.005037796	9.263731897	9.831563278	0.631814307	1.169093316	0,400975764	0,761735816	0.497766033	0.572564726	0.850281232	0.363742341	3,668638298	0.42006458	1.1288523	1.608943664	1.207641114	0,913188365
H1 V2 t0	3.605-02	1.28342518	24.22599845	0.104460037	5.971265034	0.452860231	11,26686885	48.83476799	49.93864852	54.20005468	0.653737608	4.209025695	7.139496238	0.250153138	0,161049809	0,576137629	0.214554665	0,546985459	10.09192142	2.917746898	3,165162737	5.839714648	8.541201281	6,40985601	5.495213871	7.944164954	8,998110252	12.53804212	11,11148757	12.17742976	13.06099681	10,80261435	1,015717165	11.63478455	12,85800077	0.470607591	0.282438829	0,397739458	0.381477112	0.760761379	0.493894518	0.842550697	0.394670054	1.063850678	0.10312387	0,706908482	1.05308668	0,720584255	2.040575612
H5 P1 3D	0.971864748	2,109619189	96,73272848	0.115949318	5.081143315	2,88987266	11,73420854	32,87879549	48,33981986	54.71499842	0,488768664	1.142574932	4.193769533	0,42426813	1.793426963	2.132327967	2,325462095	1,313068482	6.273231774	2.924316539	1.868963757	2.87080332	6.703182113	5.12097414	5.448903875	9,301866835	6.091762141	11.24056884	8.151499526	1.543708239	6.92700675	7.017060375	1.864862168	4.568792922	4.846020855	0.576861574	1,536698149	1,146139751	1.913887067	0.471526265	0.612915544	1.208574247	0,894548353	4,321686833	0,530986466	1,603756559	0.712318096	1.267977482	1,363338621
H P1 2D	0.502962907	2.134502741	38.12886555	0,111518632	5.613170248	2.904240444	10,56590581	38,10953207	69.70042823	82.12028621	0.582446119	1,44054309	5.072810576	0.291228161	1.621084111	1.174416144	2,341957596	1,555280568	7,435528281	4,031440051	2.555986174	2,768681643	9,656817425	4,780951569	5.787215762	9.778057041	8.044148563	11.09189885	11,07634385	1.722862887	6.272458865	9,329435489	3,076463138	5,708409308	3.568916248	0.6643881	0.426769958	0,340692619	1.78560062	0.676931906	1.001567705	1.461514048	0,576813768	1.667598386	0.442915198	2,159811403	0.840547208	1,441826888	1.504937007
H4 P2 2D	0.467462855	2.056234156	38.20234471	0.230515232	5,490400618	3,532376413	12.99542024	39,31305252	58,47875881	89,11888028	0.610970303	1.418331235	5.019900855	0.373421152	1,435760892	2.642126183	2,852909562	1,653245959	7.181223742	3.920408386	2.604284112	3.086180697	9,315742803	4,624285835	6,119406496	9,18235887	7,805796465	10.26909779	10,62210945	1,339090617	7.582524442	9.644484085	1.609558388	5.75467456	3.976701697	1.086305702	0.364969035	1,17363108	1,885349164	0.80349418	0.96946743	2.145585116	1,169113039	1,306335917	0.338466005	3,108011309	1.050963409	1,536612597	1,505738573
H5 P1 20	0.543651587	1,793508407	36.03204148	0.175143838	4,600617698	2.574530008	14,05976269	35.29612046	36,30704959	38,30704858	0.923090371	1,320841185	3,740473099	0,723972051	1 237 128762	1.960300849	2.235200516	1.026467036	6.449691069	2.822843216	1,955128465	2.459270284	9.202602512	3.70432959	6.430749718	10.48060069	6.787000717	9.791822816	8,980680688	1.276862277	8,707110583	7.180024565	1,761866087	4.512218706	4.103404998	1.143094938	0,516528255	0.98056715	2,998509555	0.989161585	1,078973938	2.320048835	1,325881758	1.397241773	1.012366932	3.314347202	1,000125084	1.72467228	2,11407474
failure pool	0.563012808	1.974062517	24.91632838	0.165223543	5.163366386	2,035680155	13.63928438	32.56636092	43,61031652	58,44454367	0.606028834	1,541743481	3.982907846	0.298568027	1 430645893	1.402865274	0.706271534	1.408764041	7.131102869	3.434948923	1.880341817	2.918359387	6.763218112	7.404785733	5.590616298	9.041797201	6.944977864	7,636201295	8.634238881	0.934050212	6,586516448	7,398131891	0.997393508	4,38097919	4,375731694	0,448961688	2,57723008	0.734906888	0.601495831	0,394897957	0.446244605	0,535655307	0.595008017	6.009395549	0,860381999	1.201108371	0.468437574	0.972417085	0.562108496
H4 P2 30	0 620146952	1.822887384	42 15305285	0.114907897	5,152985898	2.841572293	9.597114182	34,95251239	56.23673424	81.81389212	0.538758103	0.872435407	5.256355042	0.326771454	1 244580879	2 3R9977721	1.975516413	1.433222817	6.225911646	CHRONICA P	2.016416698	3 050734207	8 05304358	4.086898472	4.793907209	9.668153573	6 39851543	11.25612688	8.87008788	1,127588919	7.502466565	8.007848934	1,159709394	6,016598581	3.911163963	0.715716774	0.561973556	2,083875002	2.106534421	0.641660349	0,819001028	1,483144759	0,682308084	2,033091331	0.351536161	1.963529863	0.862462885	1,419135024	0.992237246
no)Indrason NOS	UE/UE			CSO2	ZDZD	2D/3D	ZDV3D	20/30	OSOZ	OE/C	ZD/GZ	20/20 falling vs. cartilada	SD/3D fulling vs cariffacts	2070 follows vs. cardings	20/20 falting ve cardilane	20/20 failure va, cardings	20/20 follow vs. cardilage	20/40 follows vs conflade	SD/3D falling ve conflaga	20/30 follows us cariforns	SOUTH FORMAN CANIBRE	Spiriture on Cariffed Cariffed	20/20 telling va carilland	Specifica ve carifor	20/20 failum va cardilam	Spran fallers (notal)	SOMO falluta (adidi)	County Design (adult)	20/20 fellum (adıdı)	20/30 failure (aduli)	(lither failure (actual)	20/30 (after (adult)	2D/3D fallum (adult)	2D/3D fallum (adult)	2D/3D failure (adult)	2D/3D falluro (adull)	2D/3D failure (eduil)	2D/3D failure (adult)	2D/3D falluro (adult)	2D/3D failure (adult)	2D/3D (alluro (adult)	2D/3D failure (adult)	2D/3D (afture (actuit)	2D/3D fallure (adult)	20/30 fallure (achit)	2D/3D fallure (adult)	20/30 fallure (adult)	2D/3D failure (adult)	20/30 fallure (edult)
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Ameelon		AARASIES	AA643136	TRY128	AAR45015	A4937895	AA844938	AA844818	AA894557	AABTOON	Mostan	AABB8278	AAABOBEE	MARRA	NETTER	143/100	AA97000	054040	AA459830	Lange Man	Meaton	100192	DE0076	1,0050	AA995988	MOTTER	W3/703	Netro	AARA4120	NZESS	A A RONGES	AA405937	A488182	H09730	AA285155	AA873351	H12320	AA856558	R43591	AA633768	AA496380	AA625632	BAORSO	AA486072	NBO129	T67270	AA775304	AA464743	AA663983

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1,958193928	1,866191062	1.21495112	4,353783816	25.61671577	3,03200303	1 06319634	1.778833598	1.090858575	0.980664218	0.637643567	0.409050076	20.72524354	23.34221611	5,427644127	27.20955224	27.82261502	25.01170127	17.11695398	22,42777135	20,20000016	22.29749728	0.411960124	9.063379829	7.969342929	8.464122084	7.877309384	11.33979162	7.207953341	0.742502214	11 2698502	1.02841734	6.447187287	3,421688731	18.29553133	12,89772918	12.94888047	13,28038761	11.59505554	10.50190917	2.1596/0081	7.871176277	17.03793178	6,424661999	0.728786505	1.725014554	0.77817085	1 0700007	1.998287174	1.188075083	0.615361758	
1.068524094	0.815020862	0.38554521	4,994432581	48.51971658	4,5042010//	3 025-02	6.23E-02	5,26E-02	0.293284362	0.315197383	1,92E-02	32.81546787	37.62408166	5.599238453	53,89058071	29,205598	28,42844313	31,40872062	38.44938631	42,01213318	37.1720164	0,103572238	10.11315283	9.251590954	7.850369977	10.11952938	13.40703529	6,736761694	1.6043/0138	13.14844812	0.113909679	9.067245371	3,356931434	23.57251468	20.14729059	17,49834817	17,9357522	15,68194498	17,25793589	2054641085	5,049991825	25,92346393	10,18458119	0.134116019	0.354185573	13.238/1143 9.95E.M	0.440443404	5.92E-02	0.263868115	4.126-02	
1.024786523	0.558453728	0.290250898	6,718135076	40.84657624	4,515305124	1,5/3/6018/	0.479395409	4.35E-02	0.192428939	0.141650059	3.19E-02	33.27001038	37.00532862	5.405043355	57,54473062	33,38357052	34,23348928	28.50781759	37.7985424	33.03819082	34,11709903	0.103142991	9,869201884	9,358593384	10,55026075	8.219606806	14.02690248	9.624639345	1,598312321	11,54052428	0.795108686	9.776711668	3,697482133	21,28041445	19,51320109	17.39386742	15,59400571	14.68622205	17.52701687	2,492378456	4.373418086	25.19427243	10.27562393	0.25384904	0.595702083	14.65/46423	0.715920001	0.260977316	0.304936811	3.065-02	
0,853238694	0.496740614	0.529437509	3.76308931	47.48372041	3.416182085	2.5/5865932	0.147732522	0.156264888	0.207718277	0.174872171	2.965-02	44,49536923	60,11034283	3.622778825	43,55754452	50,26187697	41.6509187	32,44686223	32,25023119	28.64881089	23.61056895	0.113769783	10.12150087	10.3223248	13,98924616	8.554543073	11.69250488	9,839101581	9.335135467	9,895195623	0.511427071	8.886781354	3.272998057	17,53371006	13.97404342	16.26843795	13,19450881	11.96847998	15,14400311	2.328337653	4.718893827	42.07314192	6.597531463	0,303760633	0.43081793	11,90630685	0.117270399	0.235657222	0.324882792	7.62E-02	
1,724576212	1.58843476	0.974500161	2.937213126	60.24320179	2,154530239	1,339633814	1,214458176	0.651631382	0.278813589	0.114965169	0.230927882	32.28482203	54.93185512	2.512849593	50.80500421	44,39487164	41.54702124	42,44280692	38.3684724	38.42578454	21.88455412	0.53496355	10.07318456	9.593900583	11.03937435	5,14548369	10,65425592	10.22004433	11,5865327	10,49210118	0.601101088	8.98515106	2,303548324	11.75303107	12,70121113	13.47424147	15,13185304	12,90834328	13.14384264	2.12162749	2,689809619	37.60777602	9.094322838	1.088792528	0.419248635	11,4292329	0.370314559	0.2482443	0.843138309	0.509055108	
13,34177496	15.81952721	5,143824512	3.256015168	36.04470776	2.298660486	1,703691212	1.248745094	1.11200994	0.25952362	4.345-03	0.17695605	30.86231132	49.46272263	2.119161449	41,49374024	34.76574485	29.7220802	27.314568		39.98311042	23,18365845	0,103328665	4.06566807	8.480460276	15.89036327	3.55905762	6,059875542	8,725898139	11,22768955	10,34284903	0.441158367	7,898742343	2.014829497	15,35025693	11.90157085	9.978745784	6,426135031	8,65144627	12.22946701	1,907000339	7,304547885	30,32802604	6.300783712	0.788537659	0.596171232	8.3175/0259	0.2229/8133	1,62031674	2,701833003	0.622604377	
1.036497507	1.038528355	0.424685862	6.173829216	39.17088563	5,85445104	4.011719078	0.257442727	0.364082141	0.164239157	4.43E-02	4.66E-02	28.49610318	42.6704861	6.491096293	56,23942898	42.47813824	33,39411148	25.73280775	34.8718366	35,26683595	24.77474479	0.126355778	15,04195781	10,38848924	12.82252008	11.34413022	17,93454359	11,22331463	11,54464774	16.33748563	0.462694318	10.38626391	6.14287559	16,18438115	11,85115038	18.08483294	16,35007638	13.9599813	17.10133551	234556391	6.718804337	28,42862393	7.185543001	0.171034437	0,254618771	7.77671287	4.195-02	7.455.00	0.705352124	0.171878877	
1.359339921	1.013489887	0.246852476	10,39261667	46,00745138	5,50376757	2,441015531	0.13076449	0.345223848	0.177423187	3.25E-02	7.17E-02	29,3586379	48.90243645	4.590770914	39.44423676	44,50541019	35,33261308	29.62587768	36.70082765	35,07501988	24.39470164	0.287634172	13,78665714	10.08577783	12,04070004	9.633059103	20.20297	11.19414229	11,42516439	15.24112672	0.68013854	11.23551547	5,375893098	16.07206256	13,50161337	19,81244564	21,52699749	14.91925254	14.85387781	2.017166995	6,821939878	33.01277519	7.858588214	0.253881413	0.343955354	8.960638915	0.130869696	0.1402/b/T	0.506118797	0.220378821	
1.258079761	1.276592262	2,355684777	2,141155369	17.84127843	5.35099208	6.015264941	5.009412048	4.984390107	3.983108173	4.427870608	4.188689888	16.6788312	24.00871315	6.130314027	17.85039728	19,46457951	18,96978325	16.98487296	14.07448353	10,85546077	45.65265571	4.570563698	6.853372531	5.35955561	5,672655498	4.146462455	4,561721051	4.525368392	3.482794563	3,825719327	6.1037 15011 8.919689552	4.896228711	4.722726068	6,552005827	6.844029007	6.451127762	6.28480073	7.36978659	7.034847587	4.514629804	7.288981598	20.18144049	6.063695518	5,413063915	4.880897198	4.571138177	4,839645889	4.632563322	5.3630072	4,183284488	
1,578545189	1.663928936	1,234797131	2,330296295	24.52945535	7.48271081	5.168529149	1.863643598	2.218662035	1,534483051	0,765085426	1,55045145	22,70504494	26,86052023	7.217223212	21.16013508	26.27182686	21.44832633	21,33877846	17,70073984	14,28559054	43.94005516	1,326890261	6.447811984	5,30607401	7,128981272	5,301613877	6.371210898	5.477050316	4.131312688	4.779380405	9.566446167	7.330918349	6.216223439	9,263082719	9,508233607	8.41742583	6.946238241	9.456937824	8.507470188	5.650206542	5,676523521	26.31681248	6.61080494	2,192248117	1.664435653	6.104594281	2.154038566	1.6432/8353	1.715814755	1214174754	
2.668127971	2.49429974	1.263003894	2,743130089	23.26830505	7.23507727	5.052705318	1.517196864	1,271557098	1,244844015	0.768307025	1,152454683	19,03558124	28,22129217	7.06879228	21.63898477	26.1438582	21.45047839	21.6113028	17.27026288	14,19332756	47.83432102	0.973906438	6.611943236	5,561464269	6.904866564	4,973592031	5.622962025	4.106442783	3.915938843	4.244750176	2.067202105	7.538771775	6.221909098	8,437552392	7.923881699	7,96745072	6.983167569	9,562551962	8,266289799	4.827076947	6.369912634	23.9982204	6.423634441	2.095851401	3.202155462	5.270505052	1,876778497	1,2539,70839	1.054616318	1.127849141	
1.670198138	2,869733356	1,3560157	2.787420472	30.1499536	6,138557001	4.172040349	1.727113813	2,384859773	1,388608005	0.744183047	1,572090076	23,35924913	33.76884841	5,985736157	25.17519653	30.63855114	26.82697423	26.68120529	18,70563179	17,97620829	36.30704959	1.284880525	5.219581264	8,499381882	7.578771481	4.860194724	5.608870527	4.353339928	4.130714878	4.618092536	6.2/6/58492 9 954505847	9.50450347	5,13409191	9.55974171	8,699986728	10.40229719	B.103930847	11,34696747	10,80511143	4.903306694	6.90322093	30,01089002	8,346245119	2.752899749	3.543244396	6.753224678	2.386828552	1,671944771	1,724683999	1.346779699	
0.546444823	0.509305823	0.639410548	1.558846586	17,51369555	5.267867853	3,470387154	2 981197481	2.418647835	1.88582891	2,476258573	1,583715156	13,5115773	17.10952218	4.737477088	14,16222538	16,5080222	13,51396253	16,33393806	10,85633998	9.803849829	32,17017287	4.642300363	4.782974749	4,856265473	4.12666021	4.38442636	4.928079432	3.19002151	2,604624915	3.609211434	6.098/6062	5.053513374 F.984833947	4.708057923	7.004200569	6.216496768	6.975113261	6.234552553	9,369158012	6.791853264	3,66373147	8.251213126	19,08081783	4.765585417	2.183896002	3.795346147	4.033511964	2.622458107	1,626966689	2,131831/11 5,33982408	1.637570373	
1,633316095	1.604349305	1.787634446	2.356636943	19.50233862	7.071920614	5.248364716	2 6547344B	2.838334543	2.590688666	1,986879018	3,21585913	20,40011187	25.44236224	6,682930727	18.73518464	21.13329064	18,95998765	18.60838994	16.06992797	12.81312824	52.06929197	2,632906988	6.993441389	5.26712978	6,401728539	4.215197474	5.426081636	5.368605884	3,575328316	3.76578459	4.314381512	4.5/4213342 5.511820527	6.753953945	7.244740889	7,627425507	6,41575883	6,52121367	7.511488312	7.112744497	5.469328544	5.258178068	21,33429032	5.73905777	4.160294487	3,49664111	5.490099148	2,951127838	2,815824978	2.270265016	2.102886248	
2D/3D fallure (adult)	2D/3D fallure (adult)	2D/3D fallure (adult)	2D/3D (alluro (aduli)	3D adult vs. fetal	3D achdt va. fetal	3D adult vs. fetal	3D adult vs. fetal	3D adult va. fotal	3D adult vs. fetal	3D adult vs. fetal	3D eduli vs. fotal	3D adult vs. fetal	3D adult vs. fetal	3D aduli vs. fotal	3D adult vs. fetal	3D adult vs. fetal	3D adult va. fotal	3D adult vs. fetal	3D adult vs. fetal	3D octult va. fetal	3D adult vs. fetal	3D adult vs. fetal	3D actual va. fetal	3D adult va. fetal	30 adult vs. fetal	3D adult va. fetal	3D adult ve. fotal	3D adult va. fetal	3D adult vs. fotal	3D adult vs. fetal	30 actual vs. fertail	SO adult vs. fatal	3D adult va. fetal	3D adult va. fetal	3D odult vs. fetal	30 adult vs. fetal	3D adult vs. fetal	3D adult vs. fotal	30 actuit vs. fotal	3D octult vs. fetal	3D aduli vs. fetal	3D adult va. fotal	3D adult vs. fetal	3D adult vs. fotal	3D actuit vs. fetal	3D adult vs. fetal	3D actuit vs. fetal	3D adult va. fetal	30 adult vs. fetal	3D adult va. fetal	
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AA634008	AA683050	AA775874	AA029934	AA872397	AA428195	AA478724	14054	Wegge	H85454	171284	N95418	AA430675	AA682851	AA427433	AA100298	AA070997	H27589	N71628	AA484568	AA043228	AA478273	H05619	AA405562	AA147043	AA035384	R60150	NB4051	AA405748	AA461110	AA845167	AA443118	N92319	AA253413	AA046701	AA164562	AA486357	AA180742	AA454743	AA437226	AA458849	AA504891	AA609655	AA599158	AA052932	AA789328	AA129537	AA486209	H39018	AA484217	185053 AA454646	

0.7446703108				_		•	_	_			7 0.436123593	0,634550941	0.498009645	7 33.61266648	3 23,50761944	6 17.3599263	3 18.26263026	1 27.19603411	0.339734269	2 0.992986281	0.446821097	8 1.084397595	7 0.789070453		0.398363748	3.938693805		1.214742481	_	_		0.965119113	1.2521297			19,44908824		-		•	-	9.71E-02	9,439048175	٠.	•	18.03496456	15.37688987	12.30818663	19727774 F	•	6.973860192
6885.03	e7	_	-	_	1.16E-02		_	_	_	_	0.037519507	5.59E-02	9.58E-02	51.0662392	2 39,9630798	4 26,41862618		5 43.9394857	6.905-02	3 0.061805942	2.18E-02	3 0.156983718	0.105478767	0.815254724	1.076-02	3.02014176	_	5.81E-02		1,550682609	0.02671598	3.65E-02	9.065-02		27.61639941	44.82447844	22.18972333	32,56698428	25,65098101	0.140894744	22.79553223	1.05E-02	16.74903887	11.80737108	24.89762479	25,69413698	22.28219305	25.08441753	3 143045008		9.712940248
7.875.03	67			_	2,145-02						5.60E-02	_		3 45.8338345	30,31855172	29,84313354		36,29104725		0.432859528	2.97E-02	0.203021316	0.11688949		-3.115-05	3,267553012	4.354026018	0,130698981	0.145392235	1.69343824	3.865-02	2.815-02	0.139247414	22,99162529	25,7858523	42.55581559	21.09382828	28.33450066	23.91926132	0.581851815	20.2709434	2.15E-02	14,88684031	10,57865908	27.82736689	26,81890595	21.01286997	22.23297762	3 661787064	2004177777	10.44142681
1 R 495.09	. ~		_		_	_					2 7.85E-02	•		61.77202168	37.93370032	91,7917979	3 28.01117112	33,11708939	0.109955437	0.485893021	8.08E-02		0.296042275			2.205699254	2.939835087	8.115-02	9.665-02	1.778842426	•		0.607411285	20.57635735	26,33492887	40.86775329	32.1008748	27.75233699	19,30516442	0.577281805	18.73408294	3.12E-02	14,0930363	10.78058971	24,90291416	26.33743534	24.95924388	25.340032b9	6.43604759	200000000000000000000000000000000000000	10.97162504
9 54201009			_	_		_	_		_		5 0.102809842			43.54178839	34,5554514	33.64819217	_	1 26.75522669	0.259752602	0,565508854	0.295018299	0,356012024			0.133290557	1.371280523			_	1.628253524	0.428100285	0.328940183	0.734135081	15.8556682	21.98212688	30.65381761	27.50714533	27,95239629	26.77163594	0,795196983	15.76906128	0.234647143	9.089927285	7,389629431	23.03858305	24,23743962	23.88440587	22.21025049	6 528355913		9.087650516
4 0.482018062							_	_			0.108970915	•		7 43,9286988	3 26.67225549	3 26.15447974	_	_	0.229464734	0.826718721	6.46E-04	1.53377804		2.015296373	0.295641965	1.420346967				10.5096934			1.143777395	18.3142958	22.5377778	44.95138637	25.03729443	22,03248851	27.7763484	1.409022733	21.96333121	4.856-03	11,2816684	6.607372436	21,95512611	16.6371288	25.83781841	18.57653108	5 2176009		8.685210367
O ANESAGORA	_	_				_	_	_		_	2.405-02	_	_		30.88801173	35,80834176	_		0.126712928	9.64E-02	7.12E-02	0.117869448	0,619002395	_	2.35E-02		2.776566441	0.106549764	0.101052954	2,969666922	0.118245397	0.118211417	0.214822388	18,4520925	22.55169547	49.75180877	22.05072953	30,32164188	30,15379516	6.26E-02	22.74108924	9.85E-02	13,09339183	11,65474155	21.94307144	22,22581916	23.72047212	17.840/153/	5 029967447	PODPORTOR O	8.239721684
0.43380112		_	_	_	_	_	_	_	_	~	3 3,615-02		_		33.10376447	5 26,4028529				0.281812925	9.34E-02	0.340410827	0,439060283	0.126123783	2.976-02	3.121779976	2.400280379	0.132976244	0.18904047	2,785909859	0.161006175	0,135236965	0.406400795	21,06562623	23.15717253	43.1549231	27.41149216	31,9568203	27.613137	0.210407505	21,80183287	0.100651283	11,00979974	11.37202654	22,13388102	29.21887173	24.22764975	18 35034471	4 705025781		6.972538399
789747988 I			_	4.76237475	•	_	_	_	_		_			20.47309058	18,88009347	18,14351405		14.01615062	4.137781882	4.94920807	4.877833042	4.325105428	5.903186938	6.073296967	9.84378734	4,292901695			5,529732134	5,657443535	5.56199203	3.891969777	6.461198799	94.97057694	8,842288283	13.73636722	10,63815358	11.69858601	9.258251347	0.869563322	29.2581877	4,49413229	25.63272733	24.06147297	9.884872553	11.73842486	12,43468402	97 77700718	9.7227458	E 450699400	5,158132108
1.568082834		_	•	2.29738517		_				1.959001687	1.852274765	1.522616002	1.633779252	28.20825412	25.67182927	21.07504567	_	16.64541758	1.423442229	_	1.72732132	1.146012765	2.517322618	3,233152734	1.59150748	5.155223568	4.059831528	2,167157105	2.529708287	2.862500876	1.990935084	1.445241279	2.567871927	41.60811989	11,95282018	17.83849384	13,48520494	11,74500654	12.21640163	1.447179728	36.1199539	1,631839103	33,60205655	27.40987838	14,03043114	14.04256345	14.83224524	39 97905887	5.072419486	0 pp.00040H	6.883321967
0 631226114			•••	2,52085183			_	-	•	•	1,448745687		1,314199679	24.47790114	22.43485375			15,59989608		_	1,455020012	1.407057353	2,126182568	3.632704149	1.246881305	5.310431247	9,736730328	1.564246255	1,878335035	3.134295568	1.826235564	1.167380172	2.313436127	40.39466602	10,82056372	18.075708	14,13918278	11,74181678	12,25345162	0.852655502	35,83780071	1,118906727	33,05944103	25,87408416	13.10174715	12.87569434	13.49994947	37 95742358	4.688122666	COLVECTOR OF	5.949254753
1.747624063	•••			2.501683281		_			_		1,709197068		1,311805579	25,88217595	25.45874485	27.23128953		17.21229223	1,427789252	1.838920999	1.728921373	2,016514163	3,009055285	3.583500944	1,696068083	4.479334588	3.194315863	2.016576353	3.070758833	3.636042926	2.364224943	1.8982167	2.816687278	36.28250422	15,05040142	20,86168208	16,74193733	14,67805884	16,37945858	0.752811699	36.22684956	1,768810452	32,62815407	28.15722788	16,03563015	13,82726113	16,51983878	11.63/35402 98 2321738	4.937529758	0 m469999	6.934532239
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n 3.806242137	_		-			_				_	d 2.698323673		d 3.107515398	ol 23.89742962	d 22.02916221	d 19,79668624	12,7340951	d 14,59679193	1 2.534264127	d 3,236398407	N 2.803422463	1.105294528	1 3.60412957	-	1 2.252389181	·	1 4,481781503	4.349371289					3.04018443		10,41727609	14,12093138	_	_		_			30,77584038	25,58379208		_		43 46763026			
SD odult va fefal	3D adult ys, fotal	3D adult vs. fetal	3D adult vs. fatal	3D adult va. fetal	3D adult vs. fotal	3D adult va. fetal	3D actual vs. felat	3D actuil va. fotal	3D adult vs. fotal	3D adult vs. fotal	3D actuit vs. fetal	3D adult vo. fetal	3D adult vs. fetal	3D adult vs. fetal	30 ochili va. fefal	9D adull vs. fetal	3D actuit va. fetal	3D adult vs. fetal	3D adult va. fotal	3D adult vs. total	3D adult vs. fotal	3D adult va. fetal	3D adult vs. letal	3D adult vs. fetal	3D adult vs. fotal	3D adult vs. fetal	30 actual va. felca	3D adult vs. fetal 3D adult vs. fetal	3D adult vs. fotal	3D actuit vs. fotal	3D adult vs. fetal	3D adult vs. fotal	3D adult vs. fetal	3D actult vs. fetal	3D actuil vs. fetal	3D adult vs. fotal	3D actult vs. fetal	3D adult vs. fetal	SD actuative, fotal	3D achili va, fotal	3D adult va, fetal	30 adult va. fetal	SD achill ve fotal	3D actual vo. ferbal	total an disher the	3D adult vs. fetal					
	. 2	. ~	CI	cv:	cvi	61	CV	cv	2	0	CI	αŧ	ભ	<b>\$</b>	₽	6	4	11	œ	8	C4	~	~	œ	64	64	83	C4	61	N	α .	C) (	N N	ž	13	1	\$	9	<b>B</b>	cy '	<b>5</b>	<b>N</b> ;	=	<b>2</b> :	<b>5</b>	₽ :	g ;	5 <b>5</b>	? •	, ,	œ.
AA448400	H13891	AA132086	AA488073	N40945	R55709	H50114	AA452841	W73790	N30302	AA291556	AA598510	AA453787	H05655	AA419177	AA458807	AA293218	W44860	AA629862	AA447674	T52484	AA496810	AA486233	AA079775	W73889	R50337	HSS048	R46821	R87763	H89583	FL56048	AA922705	AA487571	AA402440 H29521	AA490911	AA486082	AA676065	R43509	N97653	AA670955	R14692	AA488979	AA443630	AA027840	AAASGB30	AA453015	AA07446	AA027042	AAGOGO	AA454218	AAAAAESS	AAUGUSZS

38402	150031	65513	19.46276288	11.84074045	19.10255765	30867	11 11062364	39652	0.977649837	17574	75093	2 40577438	14 51945378	00 0770500	20,0173333	12 00047219	20 5030870	20.0033679	00000	13,38761 183	57506	42045	17 CORESARA (J	S S	RERTA	68105	58839	80755	52685	13573	13,6412039	88689	68204	25921	76164	34392	11564	3384B	35104	86664	51692	16259	10/80	22636	1751	2025	1600	1	2184	9779	2567	3
9,150938402	3.929360037	_	•			3.835280867		_			9.682475093	12.405							10.91026636			6 B11542045	17.60	7 83997499	10 51986878	3.114768105	0.437058839	10.36580755	13.6552685	10.2413573	13,64	24.08688689	12,29468204	21.29525921	13.67676164	6.313034392	9.31631564	10.08089848	11,63565104	10.83586664	5.618451692	13.89116259	916.41	1.047822636	0,46528/42/	0.784934592	1 58410632	20000000	0.030340113	0.689208448	0.669208441 0.80944829	6,000
13.76158965	4,217440318	7.86458314	32,76410913	11.82320488	29.98195912	5.844930445	14 28658170	7.835-03	0,307497525	6.83E-02	10.05962462	17 5813815	20 19821173	20,1004111	30, 1227 U666	17.5000404	01100000110	34.10034180	18.417/4611	20.66101303	AE 4ERTEREA	44 44058044	94 60049520	7 40222057	12 BARRORDE	4 440172458	3365-02	9 009332352	19 3/300077	12.21472729	13,44540219	37.02468042	16.5049794	33,29299911	17.62059907	5,330026944	10.6491586	17.61891673	15,63826294	14.10166919	7.000673633	19.11656532	/g/ccnc//st	0.294243975	0.285300367	0213/122/3	K 44E.03	2010100	0.100040733	0.000%1010C	0.22156/336	o'ngonadari
14,22552591	4,084539228	8,296677078	31.04591265	13,54093424	32.27184876	5.006421597	10.92011392	9.89E-03	0.980966491	8.95E-02	9 714345375	18 11092619	92 8372920	2000110000	40 44757050	19,1423/030	20.05153022	24.03360178	17.34183829	20.08862291 39.00662949	20 5227774	19 6007044	200746449	0 699307904	14 12507057	4 692019402	0.009004897	12 6550145B	19 4642R757	17.12500341	19.01580429	37,33300573	14,60344228	34,63630675	18.81890352	8,431813452	11,52903302	12.02460498	13,93556692	13.57306878	9.281445194	18.50617543	28,81055/44	0.120506359	0.55/8/894	0.318509847	63.03523.9 6.099398576	0.000	9.005-02	9.5VG-U2	4 005.00	4,530,04
6.008361088	5.182503022	7,495998702	34.85110642	6,507046353	26.73160123	4.863654532	5.62820433/	0.027217407	1,401186113	0.171773759	7.498713228	13 1757222	10.11.01.02	18,333,04418	24.82803178	19.54037803	17.525545553	17.88/31/86	14,4939/189	19.64/632/	14.10502810	40.01037369	17 40500404	17.46306461	4.85395/50/	9 885004941	6.405-70	** 46364979	20.05062771	19 R5201903	14.18817428	31,64214174	9,995156003	29,04178273	17.21183969	8.752113579	9.798358874	12.09365638	10,4841265	13.99489447	5.757265048	13.86149745	26,88624861	0.231530443	0.22723634	0.206048231	64.23996010	0.180/43181	0.14701746	U.14/31/40	0.186769847	8.07E-02
7.953245463	6.357648039	9,095892814	32,72534183	6.304114807	30.90223481	6.027996022	7.00644407	0.23068029	0.374576034	0.314969938	8 74579595	14 81003519	47 52027034	17.02221321	29,90401606	14,03309039	15,82/8/533	17.39/09/62	8138.BT	23,59(5364/	13,773,0344	17,003/0421	17.45500039	17.7063053	4.435631/51	4.0285428US	4 404502508	4E 7E940694	20 90080/75	25.52023654	20.07586812	20.55802853	18,73583293	25,72188937	13,16317634	8,433442763	7.913354462	8.217327335	8.941687918	7.276840559	5.590565738	13,38561433	22,57583786	1.268031115	1,89326344	1.64075918	61.56/52824	0.21/0/9/	0.1/162/83	0.3/80155/5	1,420850931	0,32146219
7.998306197	3.843713082	7,232430397	25,69771578	2.985624257	22.14580038	4,766657898	5.126/18959	0.21520005	0.97707758	0.642103913	4 324300147	0.248969447	40 94094449	16.34834113	19.5/0193/8	17.81439029	16.1253146/	11.88952147	12.7036246	15,83191626	14,52822019	40.00040705	13.26212/65	19.80975005	3.210/2816/	4.44003604	4,041902031	44 27750307	40 75535790	19,73035123	15 0840977	34.4823112	7.127333563	23.43060422	29,34817189	9.868215304	6.56068494	10.59879067	7.652758135	10,1215106	9.876629011	9.303751927	22.93446371	4.602814218	0.282420426	5.619710529	55.52482329	4.90020101	1.850868515	1,600491683	0.27386765	2.006534993
10.02474618	4.357169927	6,657783457	28.41615616	11.1890541	31,15842013	5.959020565	7.498548839	12.183W3	0.587861517	5.40E.00	44 44067304	11.1100/304	17.23313200	16.56197931	26.94893157	17.89542241	16.75035086	30,4334384	13,42950914	16.76226171	18,46394333	27.10433997	16.11/86081	23.54412177	8.31/319028	11.16526302	0.31003130	0.701690284	24.34/603/3	18 7011717	93 16148711	35.6883041	18,69352815	33,11698129	18.28745065	8.984327957	14,28408559	13.91271582	15.02943075	18.20484579	8,458502154	17.4980898	31,51348528	0.515575177	8.40E-02	1.123906401	60,53251272	0,5974,38821	0.192484503	0.10/642909	0.10012971	0.214598987
7.968348913	3.977503262	7,10915371	31,52455984	9.736208184	22.56815563	6.43341783	7.506542168	11.01400831	* 876643541	1.0700444	44 40004680	11.10004000	13,9003151	19,30297804	31.53895803	15,78244835	16.29858697	39,31448991	14.20448178	19.00884517	17.29/164034	27,83247395	12.98452113	28.28483481	9.876235182	11.05439122	5.48051812	0.62252622	18.63466043	19.81384720	20 88685524	39 37377891	18,79713092	29.72998467	17.93908822	9,30576802	12,86153172	13.47620777	12,90000518	15,95001951	8,187976148	18,57548571	25,89304171	0.182124982	6,08E-02	0.27466038	57.38142594	9135955.0	9.38E-02	9.55E-02	0.187186514	0.14443693
3.687657081	3,176498463	3,419382811	12,70379222	3,457945931	14.18625183	2.916608408	3.045430554	3.629044952	4.824/0243	4.469019142	4.55445/85	2/322/1995	7,981/01609	8,696305631	14.68049409	6.881934203	8.070647196	8.422494842	8.874743158	14.90421282	7.65431741	9.150031823	6.953180054	6.336977302	9.824831453	10.0/501163	8214697052	15,10517/84	7,196159079	7.165656319	0.604846839	10 82804945	10.73353077	10.91245055	7,541136242	14.70024382	18.02767268	16,35083648	18,33395551	16.05415087	18.11228999	7.250594994	8.424789177	1,639697615	0.848914165	2,831110499	53,68696068	3,121521767	1,573719963	1.218619609	1,345297086	1.823393756
4.007280855	3,469099389	4.259092185	18,77333141	4.453834895	13.63554527	3.897897917	4.203343071	5.052052168	1.020480403	1.5304069463	0.868426864	3,959011//4	7.37.0052262	11.00435577	19,29291385	8.580898297	9,590093969	9,978725792	9.071703388	12.99735343	8.892468434	11.23987563	8.096867575	7.155250857	12,63274971	12.8767479	9.667688043	4.086915401	8.697819022	8,90719188	14.2047.1031	10,1533/1/3	9.902204667	13,23656995	9.771073691	19,46815644	21.22775124	20.1673057	21.41470955	14.95312607	12.74488437	11.074429	10.34313891	0.603381368	0.364790601	1.061543998	76.19336098	1.06310666	0.588907616	0.372466179	0.341488403	0.61445767
4 613959077	3.243068103	4.221352079	18,86663157	4,188692511	12.75585136	3,772722446	4,367848138	4.767347184	4 560077907	1.6629/723/	0.683939522	4.096860799	6.839504506	9.885681916	19,94632048	7.894725917	9,003209098	9.19984268	10,42093881	13,82091334	9.284097489	9.837236279	8.037236674	7.358456237	11,52855409	12.77651551	9,441691799	3.572083072	9.624488789	8.316121437	10,4266322/	4.233000301	10.09631162	14,49672712	8,268347579	18,48267711	19,54048563	19,71347085	22,39941193	14,52813828	12.077349	10,13837609	10.81932261	0.562299276	0.419746076	0.831618144	66,22096461	0.97529683	0.455935778	0.498814946	0.366281857	0.568039398
C 758888579	3.918052974	6.203528353	18.85394679	2.87937811	13.96717518	3.825043424	4.020290022	5.334580535	0.826130431	1.780931817	0.788622997	3,781524296	7,988105567	12,35710247	24.49176062	10,33188119	11,41953939	8,891746969	13,41766713	18,03616416	11.06033198	9.916311099	9.577263322	9.036823839	9.549860422	11,95762629	8.883701613	5.137119018	11,96871523	10.14342977	14./5883288	13.19983017	11.08358091	16.50988414	10,7592079	20,35395821	16.50294651	19.04935817	21.03844179	13,37191076	12.61831663	9.945496246	12,60652925	0.800620868	0,476534818	1,049489533	36,30704958	1.071215078	0.746262622	0.627950807	0.569305177	0.869230512
4.04409484	2.361717684	3,471121389	10,74549128	3,038926799	9,497839898	3.065073021	3,20278143	3.40189177	5.751409544	1.762304259	1.895822968	3.689139309	5.363580152	7,790723538	14,84685565	6.177962556	6.83233289	7,482270307	14,97955716	17.8705502	7.85975819	7.893329723	8.426674472	10.94187624	9.867844386	9.6398749	7.370289148	6,538214592	9.394727631	6.063011273	93/292/18	10.51595378	0.860489604	9.868304848	5,473553572	11.67877628	13,81116994	18,18669704	17.50162009	13.23696939	19,41866534	8.138089224	7.5264115	6.724440565	2.047232943	6,428013019	45.18459033	6.805032154	7.417782102	7,906110384	7.143369152	7.761267038
20000000	3 274998157	3.009842745	15,77248197	3.957168294	14.4127364	2,689108898	3,339124505	4.041914565	2.582136051	2.848144946	2,588814818	3,111174182	7.054093591	10.98757317	14,71408525	8.123797741	9.138119273	8,482649348	7,649134152	9,750099751	7.944415444	9.67828656	6.86730459	5.038274076	11.09420423	10,40978662	9.965987122	7.769602383	7,356616049	7.102239287	9.978421471	8.512749427	13.76236888	11,49268913	8.661615681	17,82989233	16,55396138	17.40750225	20,58635757	15.80929053	13,71327193	9.471410325	9.047350014	0.682030067	0.402099116	0,833916304	103.2862145	1,360133945	0.476915725	0.442812841	0,359352481	0.746247673
Total on the Co	3D untur va. retail	3D adult va. fetal	3D adult vs. fetal	3D eduft vs. fetal	3D adult vs. fetal	3D adult va. fetal	3D adult vs. fetal	SD adult vs. fotal	3D actual vs. fetal	3D adult vs. fetal	3D achdi va. fotal	3D orbuit vs. fetal	3D actual vs. festal	3D ochd vs. fetal	3D adull va, fetal	3D adult vs. fetal	3D actuit vs. fotal	3D adult vs. fetal	3D adult vs. fotal	3D adult vs. fetal	3D adult va. fetal	3D edult vs. fetel	3D adult va. fotal	3D adult vs. fetal	3D adult vs. fetal	SD actuit va. fotal	3D edult va. fatal	3D adult vs. fetal	3D adult va. fotal	3D actuative, fotal	3D adult vs. fefal	3D adult vs. retai	3D addit va. 1962	30 adult vs. fetal	3D adult vs. fetal	3D actuil vs. fefal	3D actuit vs. fetal	3D adult vs. fetal	SD adult vs. fetal	3D adult vs. fallure	3D adult vs. failure	3D adult va. fallura	3D actult vs. failure	3D oduli vo, falluro	3D edult vs. felture	3D adult vs. fallure	3D adult vs. fallure	3D adult va. falluro				
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	AA400340	AADESTE	AAB12973	AA453471	AA284693	N90281	AA629542	AA679345	H37774	187181	AA454879	AA147640	AA757429	AA490991	AA422058	N66208	AA630778	AA827287	AA488084	R89715	AA480501	N32199	AA434404	N93686	AA292676	AA464417	AA442092	A026644	AA481484	T68859	AA699560	AA705069	AA457739	M38843	AAAAanaa	AA16440	AA448453	AA280692	AA031514	R33154	AA487452	AA400329	AA454688	AA486393	R52541	AA171613	AA235708	AAG68527	T64144	R14080	AA609599	AA489201

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1.181968079	0.251147304	2.113868202	6,217509513	0.41450502	0.674486801	1.716820958	0,639711527	10,14808689	8.219025894	16.93190315	0.530955426	18,50826673	0,702231009	1.386292307	0,444812754	4.39E-02	23.04551033	25,13021963	0,646399796	18,89015759	3,36017901	12,53625711	1.258217182	0.941525731	1,864138008	2.827464886	1.646361253	0.746849314	3.542/44541	1,289613916	1 169070181	4,749490887	1.552619702	2,973138744	0.75943341	1.678785386	1.006169064	0.624304289	1.36227562	1.140843508	6.856/46548 0.04777790E	4 420445557	0.740490760	4 94544599	3 70805471	0.635247713	0.466949248	0,52975191	1.014817239	5,249095284	
0.296461364	0.155852088	3.81E-02	3,716888609	9.015-03	2.796-02	R 34F-02	0.126874076	12.77350206	13.46398542	29.97197759	1.865-02	43.94952253	1,456-02	0.253395926	0.129032488	4.665-02	37.7884949	42.00937518	0.125073625	35,37693112	1,246611512	13.52405931	0.37352773	0.155852498	1,554741816	0.80663623	0,733003255	0.158684645	3,37665162	0,04105/988	0.977798949	0.335287798	7,995-02	1.242053454	0.182224032	0.124232786	4.34E-02	0.113665578	9.23E-02	321E-02	7.475.00	0.925-02	0.22133300	0.000-02	4 K21947561	0.27857931	0 237170156	0.10617339	0.108125471	4.8996271	
0.422480014	0.162468773	0.297475848	3.92242617	1.52E-02	4.21E-02	0.5//988082 8.885.02	0.189579838	12,64389145	12,4718263	30,07335868	2845-02	95.23111673	1.68E-02	0.399206145	0.155606877	7.26E-02	40,66376745	40.95637623	0.149593049	36.04823224	1.40223369	18,68745962	0.370649638	0.151089307	1.974939699	0.88003401	0.938530357	0.506081312	3.607585825	5.655-02	1.018458617	0.830886735	0,734614109	1.274948177	0.16311414	0,186066173	4.42E-02	0.118944558	0.711850096	2305-02	1.631249806	3,125-02	0.000000000	0.000000000	4 71107164	0.376548847	0.227029764	7.45E-02	0.137491428	7.995091885	
0.43616572	0.150967536	0.717693865	2,762560824	4.96E-02	0.098583152	0.472492022	8.945-02	13,83440333	9.068747717	38,36383944	0.115582035	47,96493814	0.023894127	0.223991418	0.117575022	0.22727827	64,37630302	76,13351238	9.41E-02	30,95508803	2.577090448	17,41154591	0.635222734	0.182169515	0.832256949	0.757366585	0,55317612	0.207652428	2.061478452	4,685-02	3.54/286301	2.355838772	0.153838277	1,733827895	0.178573378	0.200113403	7.61E-02	0.118954697	0.671600175	3.895-02	1,322490099	0.062230534	1.241913161	0.543185857	4 720005459	0.691717084	0.101581389	0.133198078	0.104074549	8,55181804	
0.384565828	1,742654009	0.482793426	1.919736037	0,467435552	0.256955531	9.71763194	2.227657821	11.25376919	23,31186756	36,68374593	0,506000681	48.48811822	1.529093442	5.912011779	1,683504664	5.834546017	58,7187498	77.00743727	1.215681577	36.82918822	1.746220767	18.54671153	0.834682507	3,00499051	1,232688475	1.070764965	0.74069808	0.401768082	2.194204209	1.777298932	8.633043034	1.980966588	0.512830988	1.099433595	0,59841884	1.655404779	0.490771985	1.012711843	2.516001904	0.255419744	0.726185228	0.62547274	4.307/4516/	1./65360433	1,80/214482	1,216578849	0.45228221	0.723388363	2,051917813	7.613099058	
1 576770394	6.84E-02	0.815295152	1,915196108	-3.02E-02	0.94755028	9.778098245	0.66590467	4,930581246	9.447023349	28,19627013	1.87808441	31.69253858	0.620011724	0.227984638	0.231928251	7.22E-02	42.70517498	55,28120705	7.95E-02	27.96134068	2.812909827	14,28834182	0,22361388	0.259384551	0.714479572	0.871369975	0,866552209	2.343639547	1.58773702	0.372656688	40 64077637	1.718800124	0.751879444	1,300637897	3,52385316	1.350802268	0,473352965	0.475111201	0.432784395	2.150540832	0.731237551	1,327,344826	1.346/09648	0.20/561282	***************************************	0.525583509	0.251854929	0.364362183	0,458730798	5.717565814	
0.970149717	7.01E-02	0.213035184	3,22099397	0,111757383	0,180935638	1,339071481	0.177364842	18.58361324	13.59205508	24.12483143	0.248574669	31.7886287	0.153440018	0,188125663	8.03E-02	0.148769574	37,39817347	43.27436449	7.035-02	30,96204311	2.622249449	13,71772041	0.614412924	0.116811729	2,489976812	1,353486237	1,501678874	0.312987764	3.338382636	0.229134482	3.000533/91	2.066757874	0.219962769	2.672782071	0.357518214	0.226908429	0.13827264	0.12317033	0.316450834	0.206438723	0.363378683	0.162383933	0.413840453	0,171387874	1,56924/23/	1.005637145	0.112472400	0.155818343	7.59E-02	6,863278692	
0.568547573	0.12265004	0.139454424	3,288336383	0.120219632	0.18852753	0.8106325	0.121785119	17.32761828	15.01390271	30.08495758	B.40E-02	36,06326367	0.173902417	0.247467714	0.088614629	0.277245911	69,05370315	61,83605618	0.104636512	28.06784683	1.808404003	13,08032469	0.618942483	0.119841725	1.901017437	1,201789068	1.105347869	0.124035858	2,36641611	0.287743257	1.894931477	2.198015928	0.201982284	2.103460788	0.15138684	0.330074441	0.179741117	0.163571849	0.186857806	6.205-02	3.035-02	9.98E-02	0.204788914	0.348134638	1./905/4222	0.703542309	0.070866023	0.216922531	9.13E-02	9,678698692	
1.3651&068B	1.948954368	6,00466275	6.168078813	6.315381377	2.597429853	18,32613468	6.012284228	6.808820493	18,4559413	19,5015243	1.705323839	64.50243711	5,290498458	23.68020326	4,296719254	15,29766287	54.85301063	54.85301063	1,434663101	28.04183434	3,457082607	7,329938113	6,418655459	5,235772895	3.845429741	6.043734557	4.872785488	3,484794007	3,313812045	6,384201738	2.976025283	4 51972877	4,014560107	4,451591143	2.92914746	9,321739	3.174877726	2,835780951	2.21717038	1.628641297	0.702868877	1.737947999	3,312435004	3.4465/855	5.442556928	6 573881928	6 120507777	5 776097R58	3,300796986	4.956892131	
1 307511748	0,304256579	2.994436137	3,530544823	2.021283714	1,150500104	1.77853582	0.773891788	6,192489399	8.233604749	25,31283192	0.563061629	73.01397471	1,362263758	2,244043815	0.686814595	1,746671803	102.0498037	100.8362156	0,406883851	28,56872605	2.212159729	8.794304531	1,420828724	1.082727505	1,741966813	1.76341218	2,278993542	0.803584044	1.80852383	1.579189807	3.421877751	2 663007264	1.963472023	2.281983003	0.645471218	0.327497562	0.718146053	0.327526469	0,583832961	0.314907846	0.398772973	0.446815901	1.60001113	0.698445269	1.466681545	3 308148608	4 50769999	9.7877676	0.297154033	6.00486788	
4 197474045	0.384125705	2,28349791	2.811568095	1.457265129	1,34483513	1.631870516	0.917778985	6.158463331	7.582520052	18,83195374	0.602237179	68.26659959	0,567045634	1,89558391	0.680242857	2.01477414	92,35920856	93,6827224	0,349989394	26,59339088	2,572167528	7,660089272	1,471073914	0.928042539	1,704623126	1.893217317	2,354039954	1.100317922	1.820935977	0,468266355	3.258278988	1,334834306 9 659355075	1.921932565	2.287218044	0.475083665	0.382776293	0.96145731	0.347764767	0.588441567	0.430680409	0.341800718	0.498982302	2,335301865	0.839394093	1.278460058	0.18248/835 9.702700274	4 000075007	1,025815201	0.334762409	5.227597565	
1 2/659/192	0,42423828	2.687396748	3.285602699	1,458885277	1,83711377	2.069008838	1.065046051	6.098081459	9.740301388	19,87261192	0.834546801	36.30704958	1,625298607	1,455767277	1.124742532	2,789740103	36,30704958	38,30704958	0.571045963	29.90172172	2,328026154	10,38387894	2.013089465	1.047037018	2,426871459 .	2.445625178	3,388970859	0.938100822	1.832547665	1,31983711	6.153238607	7,852/4132 9,158379807	2.232669884	2.408869338	0.849034927	0.485842718	1,751417648	0.460617918	0.916404688	0,689843744	0.499133148	0.870719013	1.560525939	1.276833043	1.470028438	7.30842/625	4 000044444	1 727581710	0.307540341	6.490413776	
CONACAMO D	7.549550263	2.221889535	2.36899368	2.706447087	6.428576897	45.10144344	28 61952355	18.87787869	34.64438609	12,79749882	6.507766688	43.66418943	1.157647486	76.64764128	15.90467626	48.92472369	61.20693911	58,77989768	7.652704012	14,89709888	8,495958017	3.918963058	9,937368538	8,525464296	6.297808737	8,391310909	8.164685438	B,756420509	7.015197496	1.841236561	2.505777018	13.5/092172	7.059371875	8.508216003	11.04039228	9.658226818	9,965593016	8.608586299	8.80359405	8.723284539	9,205091988	9,871901353	8,658749377	18.56199185	9.564497621	3,912/448/8	***************************************	1.12023033	10 1339235B	2,411089781	
0.0000000	0.446119129	3,946739485	4.670053967	3,536147066	1.386836786	2.174224052	0.746578419	4.173270014	7,730845588	23,09461759	0.483674724	77,28842805	3.738957043	2.518425668	0.794565272	2.006155548	123,6211644	125,2413904	0,338624303	30,42865911	2,044150452	7.887770078	1.98091121	2.116044289	1,650037418	2,573933498	2.130783417	1,100740148	1.601596727	3,703368787	4.911652574	1,342031028	1.395480263	2,032526808	0.721996555	0.473381741	1.047528507	0.444705701	0.63457623	0,380957115	0.319821038	0.309199103	2,173462159	0,707399619	2.035130827	6,704743363	4.187000000	3.304063032	O ESSESSATES	6,033865543	
Control on the Co	3D adult vs. fallure	3D adult vs. fallure	3D adult vs. fafuro	3D actuft vs. failure	3D adult vs. falture	3D adult va. falluro	3D adult va. talium 2D adult va. fallura	SO adult va. fallura	3D adult vs. failure	SD adult vs. fallure	3D adult vs. fallure	3D actuit vs. falturo	3D edult vs. failure	3D adult vs. fallure	3D adult vs. failure	3D adult vs. failure	3D adult vs. fallure	3D adult va. fallure	3D actuit va. fallure	3D odult va. fallura	3D adull vs. failure	3D adult vs. falluro	3D actult vs. fallure	3D edult vs. failure	3D adult vs. tailuro	30 edult vs. fallure	3D adult vs. fallure	SD edult vs. falluro	SD adult vs. failure	3D adult va. fallura	SD actuit vs. failum	3D adult va. talture	3D adult va. fallura	3D adult va. fallura	3D actuit vs. fallure	3D netuti va. fallura	3D adult vs. fallure	3D adult vs. fallure	3D actuit vs. fallure	3D edult vs. failure	3D adult vs. falluro	3D adult vs. fallure	3D adult vs. falluro	3D adult va, fallure	3D adult vs. fallure	3D adult vs. failure	SD reduit vs. hallure	SD adult va. failure	2D adult va. fallun	3D adult vs. faffure	
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00000	H46428	R56149	AM54619	H15445	AA705225	AA191488	N64862	H77283	AA436187	AA676470	AA443634	AA664180	W58858	H54023	H73724	170031	AA481759	AA521431	AA446103	N92646	AA453789	AA425289	AAB6892B	R60018	AA857343	AA481438	AA399674	T98887	AA678404	H15747	H16959	AA936783	AABBA/US H24688	AA884403	AA404619	AA598611	H72875	H63361	R39221	R02348	R51835	R33031	AA412053	AA001897	W81191	AA430552	000000	Mazan	200000	AA670430	

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1,448843062	1.726847773	0.988760934	1.152159838	4 444044977	143401404	1,01804171	0.840188206	1,95298952	1.043280575	4.592914592	0.871274685	1.258329856	0.916706477	0.458047702	3.042979924	0,55095689	0,712164672	3,384055572	1.275588944	9.633157025	1,059451655	16,42056168	15.74888433	15,16538035	13.15195793	11.65209772	11,20069358	8.597842758	0.497864329	1,313192294	1.060647719	11,02252852	10.00200381	12.57587877	2.2735197	12.52733321	11.4721218	12,11311137	4.881896262	6.728320601	9.529595044	1,494699625	11,35565277	9,331503041	4.719619102	1.26495988	0.4430/0331	9,001120213	6.214691332	6,730899031	
0.181288584	0.238667939	0.145493758	0,330253413	215266523	0.000700054	0.2032/3351 + 1734917E9	2,605-02	0.722913601	0.14420936	3.083422958	9.115-02	0,134273293	3.77E-02	4.12E-02	1.149526787	5,28E-02	0.280240919	1,424573602	7,536-02	7.832771347	0.103847056	30.08594829	18,75158154	20,77840532	15.01308178	16.14117888	18.01732542	11.60779004	19,29785097	0.322978295	10,72233164	18.65715974	11 93180117	13 29493507	18.31265802	19,28034455	18.66892542	16,222,79878	6,047516043	7.203726545	11.82952447	2,335184673	13.90026724	10,93778907	3.606526999	0.444504195	3.01232330	40 CE34979B	5.996962100	8.954783916	
0.226202587	0.912030768	0.382055076	0.579894823	23,738/6/44	1.095010505	0.192003883	1 855-00	0.941922627	0.227232484	3,500903196	0.226600648	0,436418383	4.62E-02	5.47E-02	0,765515506	7.90E-02	0.570227867	1,252484239	0.109893855	11.12950391	0,101127842	28.04573416	16.92468552	20.16185377	14,5213203	15,38509292	15,5104445	11.1584167	20.01447688	0.489769841	14.2447373	13.05741368	45 GREATRA?	15 71979929	17,93970181	20,68533459	15,19045985	12,54788533	6.519473799	6.388572117	11.59487571	3.221438906	14.18776318	9.703784616	4.149802613	0.257278583	15888887777 C	44 64760675	8.113650285	10.03817061	
0.123251357	0.316768638	0.372520434	0,966885185	21.20150657	1,534545/1/	0.516336536	0.132031879	1.254760068	0,359906823	2,539009334	0.17400072	0.354854654	0.206696214	0.101530951	0.128126994	0.158658574	0.442885133	0.880185699	0.286257374	14,4503645	0.117904267	19.87488409	13.81855051	16,36247541	13,30933358	12.64309311	15.3193005	6.522556933	19,40991358	0.327739524	18,55691796	17.71874821	19,442408/2	18 26771629	17.42255813	20,8754483	15,69453266	B.980063651	7.297448165	7.461499363	9.082441534	8,976553332	8,913277923	7.976384214	4,639918805	7.205178124	6,072708998	8.843010597	11 RABE2395	11.97285965	
5.563771987	3.879470723	0.440905543	0.891603525	61.1100551	1.50244/025	0.4860/1328	0.629386819	1.048156955	3.020669538	1,301784349	0.250293874	1,207209335	1.090721231	0.139051554	0.264354582	0.493737708	1.602848914	1,344689512	0.366215322	13,1191608	0.166629344	16,87667976	8.854697045	11,95096823	13,78588969	13,01835681	18,06831801	5,538040372	15.56699579	3,784608939	15.25547675	14.29501218	14,91020806	13 86213005	13.93477495	18.97637663	11.98270843	8.994012338	5.567148567	4.092990024	6.268355719	8.675479988	7.838528099	5.174772829	2,857181738	0.822064291	1.77122396	11.63631161	9.290581043	9.291870768	
0,293208249	0.952099841	0.98261567	0.779087405	15.15010606	1,521390918	0.91954/636	0.478074395	1,436906175	0.372150077	0,792805821	0,323575075	4.097425592		0.262096407	11.12264238	0.282480027	1,16372394	5,577800931	0.803404707	9.172410684	0.253533697	14,91138327	5.611565027	12.57587929	15.82656015	10,78900463	9.970977757	6.372712462	15.68021927	0,378626744	15,34324385	8.941211837	30.6526342 45 00360444	94 94685479	17,83072198	14.58097392	6.057610695	7,452925146	7,23111917	3,720477618	5.034714528	12,63852019	6.71563807	4.418447748	2.830978933	1,58807476	2.38/694789	10.54302042	4./66128161 8.916348201	10,50165717	
0,176033115	0.363796565	0.165726325	1.184985842	23.60460158	1.6/820494	0.145445316	0.957667674	1,714822504	1.508084468	3.452207016	0.161663182	0.390512087	0.379318202	2.39E-02	1.081371373	0.253788068	0.808392548	1,846198647	0,935468411	18.18200978	4.38E-02	20.04405194	16.42885435	18.78310438	17,55060555	15,97533753	14,22534282	11.65322402	15.705615	0.375913694	17,32979473	15.89605854	12679521	16.03503947	17.12092824	18,69369476	18,98378867	17,61623036	6.492363676	10,58867058	12.88357607	10.79705267	13,72066077	11.23143802	8.278041624	0.16825892	6.300937638	10.66885848	14.86/791	10,50311685	
0.246596976	0.385872016	0.297379076	0,963197456	29.7307313	0.83030089	0.292745156	0.20000483/	1.534002053	0.438480922	2,009112662	0.069421532	0.769668027	0.446474167	5,235-02	0.630754179	0.205039081	0.683742215	1,418874982	1.02446963	16.59350558	8.69E-02	21.76297737	14.92249068	20.21677625	15.72505574	14.70872577	16,40914268	11.40467488	16,63164161	0.333624301	15.28422925	18.42366544	22.16035468	45 2105068	14.5790754	17.74782242	18.34330926	18,47809437	5.246470108	10,15319844	13.24455202	10.61031688	12,7227255	10.92967968	7,903009948	0.238444224	7.336818392	9.713113247	11,36787871	10,70832344	
8,309498154	8,478935818	9.043391314	9.248530935	11.67500348	12.08244483	2.656973499	4.04494813	4.020015252	2.157496735	3,540786101	8.161295359	2.756568614	7.786959581	4.078616944	1,710017559	8.171254871	8,385883028	7,71821785	3,830886431	3,029043454	3,189323952	0.518398472	5,273916388	5.089326434	4,372991798	5.712216735	3.624913174	120775425	4.332423617	15.7136877	1.173334441	5.941479667	4.689863101	9.000003303	8.404118354	3,486560771	5.167664215	2.024350761	2.528269298	1,148805945	0,95599115	2.217883077	1,567,701571	1.600296237	1.257230087	6,551716983	2,561266549	0.712979229	9.882435808	3.414286314	
0.71972912	1,932689792	2.855536228	5.143577569	8,361428458	3.988124217	0.844150341	3.1423/890/	3 257043268	1.286762868	2,788331395	3,532284326	3.375402585	3.816425244	5.286395351	1.13174848	3.879401032	4,424021889	4,529769385	2.840523285	3,642114467	3,473443896	0.684508861	6,187809857	5.205993927	4,433039078	7,690736998	4.819190027	1,673578671	5.302346746	2.977614141	1,434340053	5.655909478	6.033089317	3.86865/8//	6.754823259	3.942866534	6.212911071	2.528689751	2,820757906	1.191952306	1.521167268	2,484151334	2.543886171	1.775527487	1,348266115	0,741672703	1,758025333	0.513908343	3.458748044	4.445703612	
0.968365361	2.029202014	2.752079821	3.830306615	8.740060641	3,597022308	4.045770491	3,900,90463	3 193476491	2.407065102	5.314258483	2.683871598	3.324684095	3,593768792	5.234422192	3.457491381	3,315340662	3,780076886	4.651935893	3.110031038	4,289702271	3,415990384	0.634647941	6.3957827	5,791985355	4.2528688	7,100383442	4.780513481	1,63158512	5,519559327	3.421263628	1.106008283	5,183053806	4.917562173	3.444600254	4,022037302	3.573649092	7,059542516	2.65444359	2.591526171	1,213892433	1.538376189	2.256040758	2.265340283	2.076882204	1.5150059	1.123878939	2.820706627	0.608221718	4.23836901	4.325871481	
1.394968386	2.807387159	3,861101886	3.928274978	12,32476105	3,801345873	1,411911686	3.751606548	4 47021030	3 922092662	1.80235047	3.133883202	3,782759943	4,287813007	5.624793808	3.823258324	9,254611387	5.329740351	5,909433903	4.174172878	4,337837094	3,786734961	0,599111691	4.803264368	6,533218517	6.257612264	6,844706058	5.804136792	1.577772215	6.670594998	3.896084321	1.246173941	6.877620638	5.859700035	5.207796008	5.50014925	4.05845178	6.884450204	2,490940902	2,708923499	0.919694908	1,456101082	2,427419475	2,323118997	2.289079847	1,394720158	2.051238468	1.382975298	0.637447262	3,833343191	4.396947289	
27,22345134	29,04646478	3,357895765	3.855068049	40,45864114	7.619281816	3,687865805	2.759942512	4.03568363	0.578162102	3276856168	2.720044947	2211041944	4.989070689	3.400688787	0.7909906	4.238881966	4.133060912	4.222679024	6.744755801	3,831327794	2.636358787	0,435637611	6.237266898	5.999132858	8.924589287	4,945597359	5.642074949	1.500609747	4,571809686	42,17808573	0.697979245	10.12778251	3.541329987	2.634463051	6.596605083	2,338234619	0.427635974	2,246509212	2,464809211	1.145219423	1.42629856	2.651354597	1,850428013	1.874219046	1.688694122	0.456756191	1.234497382	0.381600207	3,907165525	2.637756736	i
1,133236265	2.577273943	5.690914196	0.957108219	6.411864475	6.029716769	2,436813979	3.44985341	7,001,100643	+ B00050483	2,115795984	5.316788651	2.078301835	4.746090464	4.749539144	1.920163507	6.194625221	6,809538669	6.014247582	2.788220682	2.892697648	3.843410664	0,460743655	4.694309329	4,489190329	3.322360737	6.72316462	3,473141273	1.47258426	4.097759837	2.916040437	1,22088245	5,113683679	5.047585747	4,59919155	4.780848020 6.695606523	3,826186364	4.988675925	2.29694825	2.329206672	1.134352578	1,256026253	2.159542225	1.898590687	1,85505455	1,145861617	0,754036384	2,427318967	0,627874118	9,384460323	2.239479445 9 R38221727	
2D/3D edult ve. fetal	2D/3D eduli vs. fetal	2D/3D adult vs. fetal	2D Markor adult vs. fetal	2D Marker adult va. fetal	20 Marker adult vs. Istal	on Marker adult vs. Island	20 Marker adult vis fefal	20 Marker adult va. fotal	2D Marker eduli va. fetal	2D Marker edult va. fotal	2D Marker adult vs. fetal	20 Marker aduli vs. fetal	2D Marker adult vs. fetal	2D Marker edult vo. fetal	2D Marker adult va. fetal	20 Marker adult vs. fetal	2D Marker adult vo. fetal	2D Marker adult vs. fetal	20 Marker adult va. fetal	2D Marker edult va. fotel	2D Marker octult vs. fetal	2D Marker edult vs. fetal	2D Marker adult va. fotal	2D Marker adult va. fetal	2D Marker adult va. fetal	2D Marker adult vs. fetal	2D Marker adult vs. fetal	2D Markor adult va. fetal	20 Marker adult vs. fetal	2D Marker adult va. fetal	2D Market actuft ve. fetal	2D Marker adult va. fetal	2D Marker adult vo. fetal	2D Marker adult vo. fetal	2D Marker adult vs. fetel	2D Marker adult vs. fetal	2D Marker adult vo. fetal	20 Marker adult vs. fetal	2D Marker adult vs. fetal	2D Marker adult vo, fetal	2D Markor adult va. fotal	2D Markor edult va. fotal	2D Marker achill va. fetal	2D Marker adult vo. fotel							
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. AA683321	AA608557	AA757764	AA406064	N54598	AA481088	N62394	N26148	AA496678	A 407007	NEAROR	A A MRRS GA	AAABIDB	AA159577	Bacasa	AA62808	AA482067	AA689314	AA775241	H73584	H28984	R44202	W70051	AA401972	AA236164	R22412	AA424804	AA669443	N69689	H24316	AA074224	R38571	AA058465	AA633811	AA457155	AA459104 D4m212	AA086476	AA663310	AA455640	AA496878	AA085749	AA425755	N52350	AA630104	AA454854	W73408	R12802	AA465355	AA828383	AA629189	AA458512	101100 P

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4 44444064	8.981574288	0.86098332	6.501582684	4,689359807	0,163149057	0.435225813	0.75481970	0.245535885	7.16695928	8.365452414	3.524676899	9,330359142	6.241060625	12.16467252	5,815135248	4,055039882	8.269159968	8.212583544	4.209708438	1,0315/2668	6 72263519/3	20 77058355	17.24254068	20.5248881	19.43620727	26.0742679	14,25827129	3,899562773	18,03374987	23,94024054	7.351059946	5.920549076	6.84688358	13.96412248	12.27802285	17.91174019	23,62696499	13,58503588	23.20296225	18.30430878	1.513482669	28.26604168	16,3537237	35.76767897	22.17775304	27.72434403	23,4501438	23.67050394	
	14.66848169	14,74331878	7.898182283	5.542126135	0.048832125	0.216046798	1.85E-02 0.198086927	3.16E-02	5.008133377	7.982378371	3.084623388	11,89006855	5.823237791	11,45011681	7.820823897	3,815787701	7.050636979	6,973213882	5.074757452	0.867383834	0.46646531	31 53/61788	34.54349578	34.17207689	26.82888212	30.25084933	18,51583887	2.591977848	30,16564203	36.82338782	9.98471585	1.505/20221	10.00804431	19,65621623	20.17449968	34,99886458	55,61472182	19.37029588	41.23242017	30.31298784 29.07865921	29.15914588	59,03512613	29.24827598	57,58008452	36,92808227	41.79371663	49 0E0E246E	43.85324507	
0004277000	13,4943961	14,28706841	6,944350085	7.505442874	7.77E-02	0.218741059	0.340974608	3,735-02	6.665109387	8,791269951	3.718900078	12,751,78351	5.862550486	14,44791388	7.785585109	4.100967576	6.83857547	8.049767975	4.198944242	1.104353244	40 64026043	31 43971629	29.78805939	32.77696512	30,11933147	39,38644138	19.71196965	2.914913803	28.22982528	35,22864254	8.824169559	41 05450476	10.14587035	18,49023492	18,67319453	27.58973385	52,63193582	18,1389079	33,76040637	25.85987278	23.80169892	50.78509048	28.5580241	54.65064588	36,99198256	40,42215172	44.44763769	32.20561704	
03700404	14,48792372	13,22862391	9.090198422	4.997212679	0.310786175	0.435231923	0.150055455	0,103986984	4.636042504	5,546998168	3.687011927	14.05262104	5,388152041	22,79559771	4.110023154	4.2780267	6.054186478	6,282000648	E.580591133	1.756/13201	4.46940750	37 57564917	40.06670353	34,84762552	39.51187698	40,1563207	34,53593287	1.67228768	38,26709788	35,98104596	6.206941047	44 48200000	8 536351201	10,29990367	7.929841139	37,85290764	76,87450563	12,51504107	28.41338729	21,42687241	37,16368231	41.1840771	43,16878807	68.90492839	39.01685985	67.07416778	77 97021508	55.94493635	
00444400	17.4722782	8.741499108	5.802080978	4.651309743	0.244900677	0.480744514	3.141140333	0,353760379	3,851620223	3,741685834	2.49073858	11,63388016	3.229088085	22.91566491	3,325162711	2.749913448	4.615880778	3.789767104	3.551786441	1,465812184	1,910830494	32 67661467	36.86801888	30,50800393	34,41711929	39,80567516	32.4048278	1.258440944	45,78348359	28,85287545	4.378972352	7,432531008	7.736489528	9.83113847	8.613564071	29,3258109	67,09649695	16.08639335	32.89736617	15,81791403	29.19560183	60,0670886	37.21129787	56,17239995	29.87756141	57,55943844	74 07957EA4	20.13909587	
9 meatherra	15.19497586	6,32559769	4.185436741	5.685609821	1.038303088	8.557633935	1.531771465	0.814748807	4.344522356	3.091038965	1,395463454	11.11466575	3.642022531	18.04191799	4.924342984	1.61148811	3,440351838	3,473509988	2,192838503	0,833003333	0.455340310	31.95383406	28.60631666	35.571325	28,23461359	31,54660297	18,96936278	1,373480533	33,03970317	30.14609328	4.900254154	43 64699708	7.998759206	7.43845534	8.039460846	14,29348739	54.21416245	14,35096285	26.29856571	17.74038543	42 41594013	42,20898479	34,25368088	53.21442136	34,05249693	65,30284844	53.1/403314	31.80537257	
40 47004559	14.72856784	13.67189221	9,202396521	6.633601899	8.49E-02	0.339390237	0.242118984	0.268810127	7,592113899	7,7581352	5.346765011	13,54683348	8.748871101	21.11752477	7.596990399	4,749402103	10,15056984	9.836219264	7.111662492	3,730348/11	4.289U3/4//	26.2503522	22.9626093	33.89347601	31,39298491	37.41727747	21,24106888	2.618617925	30,32593937	25.78523385	7,303817317	7,982251483	10.26903792	21,39567723	14,33475919	29.27828702	48.27594603	23.20566188	27.03519888	24.87271063	36.1181983	39,39007192	31,82358739	46.63476256	29.39427889	44.65368856	41,265,887,09 E4.794,6564.9	41.25447374	
0 700074540	14,97773748	14.02006989	8,316574942	4,910901674	0.573341181	0.570691633	0.532639955	0.223635364	10.14341863	B.06934578	3.965389223	14.483682	10.42303829	22.00681959	6.612396808	4.188050396	9.49585425	9.890487467	7,117192529	2,37,505,0100	11 97100678	29 54707294	24.27150375	33,402247	38,02091306	31,48764197	21.41973277	1,833795538	39,32983741	26.67604716	7.204336211	10,76945162	9.6993387	18,41498084	13,4092855	29.82871509	63.79098202	23.38181778	29.96970494	24.70820419	29 7099729	49,309,301,77	31.19009514	45.77501651	34.89731064	45.34684388	CE 46700000	47.23582949	
0 6754 45400	2.393138312	2.129569504	0.511406835	1,132910683	0.950844105	1.70047288	9 982352025	11,3903699	0.333601513	0.903409454	0.743361638	4,496005768	1.87592009	5,169772778	1,415959631	1,097445419	1.836297875	1,670136989	1,978094745	9.2000d0104	20 21200074	8 653R35R49	6.246092446	9.520621452	5.827918931	12,78716552	12.29601389	4,776266565	9,180810589	11,63880939	19.41686845	19.80045327	24.05531978	27,93817331	24.38068282	10.87358414	19.64403686	0.645073541	51.53609212	54.288/7782	54 R3B12392	54,85301063	14.041252	13.99432924	15.02548971	15.10253571	17.8553/212	14,51633105	
4 059095464	2.835386395	2.639132034	0.647054285	1.289148537	3.2675415	2,405945118	4.811555858	3.90840295	0.27564065	0.998364163	0.683526033	6.588429457	2,299471554	4,524489662	1.594500153	1,102669725	2,517626988	2.280636291	2.381629453	4.884/31/09	2.352850319 9E 99469909	12 (73535219	B.126515643	12.31290239	8.883600715	13,89478922	11,20438161	3,671031365	10.46454533	15.16820039	27.05702114	30,85067131	29.89868189	38,0810897	31,81897761	14,93518352	27.16189634	0.723063592	63,73545411	84,60136833	103 4568246	85,63154687	16,81550288	18,88134711	16,83874726	17,55058275	18.34433042	18.94151907	
2 60000000	2.77240442	2,530348937	0.716948884	1,335828319	4.449090919	3.470498129	3.24/693912	3.357266094	0.30807128	1.167561655	0.730299571	5.623320599	1.946327352	4.733579692	0.663751034	1.070264972	2,650969074	2,716178444	2.790851259	4.835/08503	1.785197631	11 05918225	7,014086953	11,42865371	7,808367958	13,18842124	10.03671065	3.529883953	9.805337766	12,44206045	24.07754444	26.29257303	27.23129085	35,98378599	29.51377393	13.96133558	18.72935308	0.801834491	58.88107815	70.83386123	95 95771788	95.8034517	14.88223883	16,98965403	13,88763897	14.6094675	18,53302602	15.7697112	
1000000000	3.282718575	2,345768887	0.823172955	1,354496565	4.80929041	3.616532831	7.36008568	3,770230181	0.297974786	1.034076531	0.574022043	5,540191589	2.060524963	5.786261707	1,889966508	0.848143007	2.540675832	2.916200392	2.705734803	3,0503/4244	2.113340283	12 75918957	7,385439482	12.55072628	7,61347718	15.07029688	12.27393806	7.12266851	11,21693205	16.97946166	26.13232552	27.02787268	91.18437988	33.60796008	26.021072	12.04192878	26,29604395	0.865056345	36,30704958	38,30704958	36.30704958	36,30704958	17,95968118	19,64085664	17,53351276	17.95609277	21.62823027	17,88558853	
2 500000100	1,949529953	2,77044995	0.718935768	0.854777758	0.38760124	1.076238697	4.145659051	3.130374276	0.36769394	0.850650279	0.687368102	4,481415857	1.077976801	3.784033955	1,31739538	0.76877689	2.638681789	2.664699416	2.642651634	5.67 187 9456	2,164212/05	7 530891578	5.235719613	7,964616858	5,43569693	8.07158282	19.01587747	6,313693676	7.542950447	9.041851128	18,55051373	20.62648968	18 GR1604R9	29.13821092	24.48751872	10.90299489	12,81904882	0.519829853	43,81206927	67.95745288 E4 EE227E98	70.24733836	60.91386332	8.900969331	12.2589771	9.830784212	13,80042191	13.548/0388	15.15348782	
4 0000000000000000000000000000000000000	2.749565753	2.817741285	0.551793053	1.572133229	0.857314271	1.987500842	979200000	7,687530164	0.182901012	1.088783309	0.537932542	6.089061165	1.523155704	5,890519553	1,23978305	1.217420137	1,988298813	1.834366714	1,74393914	6.36633046	1,5562339404	o 750993225	7.177282564	10.41970608	7,66464154	14.07113881	10.9079267	3,30738816	9.488691926	13,3365169	23.53014662	28.08351962	27.28075277	31,30959843	27.28836746	12.54762444	31,12874985	0.626099905	58,25496123	78,7226545	01 89027489	100.7022767	18,18260113	16,15200019	16.54096888	15.19512412	17,24244099	15,1000594	
free of the section of the	2D Marker adult va, fetal	2D Marker adult vo. fetal	2D Marker adult vs. letal	2D Marker adult va. fetal	2D Marker adult va. fatal	2D Marker actuit vs. fetal	20 Mander adun va, tetal	2D Marker adult va. fotal	2D Marker adult vs. fetal	20 Marker actuit vs. Ictal	2D Marker adult vs. fetal	2D Marker adult vs. fetal	2D Marker adult va. fetal	2D Markor edult ve, fetal	2D Marker adult vs. fetal	2D Marker adult vo. fetal	2D Marker adult va, fetal	2D Marker aduft vs. fetal	2D Marker achd va. fotal	20 Marker Boun vs. 102	2D Marker adiat vs. tetal	2D Markor adult ve fetel	2D Marker adult va. fetal	2D Marker adult vs. fetal	2D Marker adult vs. fotal	2D Marker actuit va. fotal	2D Marker edult vs. Istal	20 Marker achill vs. Ictal	2D Marker adult va. fetal	20 Marker actuit vs. fetal	2D Marker adult vs. fetal	2D Marker actul va. fefal	2D Marker adult vs. felal	2D Marker adult vs. fetal	2D Marker adult vs. fetal	2D Marker achili va. fctal	2D Marker adult vo. felal	. 2D Marker adult vs. fcfal	2D Marker adult va. fefal	2D Marker adult va. fetal	90 Marker adult us fatal	20 Marker adult va. feful	2D Markor actuit va. fetal	2D Marker adult va, fetal	2D Markor achili va, fetal	2D Marker ochil va. Icial	2D Marker andus va. retal	2D Marker aduft va. fetal	
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1007001	A644657	R40460	W96058	172202	AA598794	AA599178	H6824/	AA454858	N6704B	AA778675	H51117	N36174	AA777187	R09561	R16849	AAB84167	AA136983	AA486622	AA699427	AAABDADA	AA626/8/	00175N	AA441895	AA463924	N78843	AA629719	AA464765	AA459351		•	_	AA397824		_	AA253434	AA455058				AA455272 2				AA291490 2	N46828 1			AA443638 2	

	12.5222324	10,93049868	16.68407949	23,51879387	2,223501134	5.462605703	14,02066164	19,26967888	0,278258082	22,75939773	22,8496167	11,5187422	3.040695852	30,55831089	3.973103926	6.595859335	0.885776492	4,163095485	4.062391389	3,356087801	1,552308165	3.007772428	17,40551832	6.90313221	20,25532838	13.12039825	17,36904023	13,82120963	30,13431188	18,78769736	21.79020976	23,03958218	15,45920589	24.37523888	16,44600319	4.36497318	8.624379722	0.416874791	5,753606895	15,10292793
	18.76283359	19,12043735	19.11368361	37,83023417	1,310369445	7,199616962	18.97220606	31,50513283	33,56546319	33,3028934	33,29284839	16.22677894	1.835282947	49,3716344	0,500500102	6,1678428	4.41E-02	1.733369881	2,976132273	3.959090691	1,595312179	1,575172599	25,96878567	8.678545684	28.90088593	21.58624772	31,7331025	25.91588986	54.37468138	22,78223035	31.10677394	28,03401198	20,7481208	37.13241221	23,22437469	6,63139433	11.80853014	5.294681541	1.540288648	19,19135064
	19.26896493	16,31280635	19,25424118	35,02888476	1,304498683	10.0915921	19.81870818	29,94953555	31,13378929	31.27308752	27.14137043	15,26211932	2.051133108	44.28043077	0.485854727	5,761751821	3,91E-02	1,404546398	4.179216222	4.180826657	1.985365512	1.856888897	24,93265482	9.111161437	24.55752432	21,83073616	23.90922453	17.75212522	41.74942514	23,98829793	30,73388527	28.88595169	20.1376127	32.85178948	20.92597239	6,412726238	11.79753397	6.505644423	5.084900046	20,61037432
	13,03977036	9.864935146	27,82013988	28.5320194	1.71524513	10.01008974	24,29216348	19,53245951	22.5718942	26.21817206	24.58402722	21.34886081	2.258178208	23.02878278	0,387721776	3.214957653	0.125110544	1,525470041	2,379536052	2,808813532	2,0821831	2.17588501	29.07492798	16.20593802	30,33897486	25,53193168	28.21785542	28.53431361	30,35228689	21,26931438	31,37132599	29.82364688	29,14739213	29.26747712	26.90427658	4,220279818	4.74719124	3.681140068	4,552424226	28,05090535
	12,42664249	13,77803964	22,5131702	35,51331268	1.038420135	9.12471674	20,5027043	27.67062775	15.8784486	16,0871738	19,51273682	16.99045362	1.10758798	29.43169864	6,566440211	2.155743141	4.298069671	7.A15723464	1.68375405	3.668199484	1.456785844	1.264654536	22.2287943	14,11437595	30.51834358	22,61456267	18,65335792	24.0071361	29.16377551	17.92470933	28.19647166	25,90328811	23.9119729	29,39443068	18.07436069	5.009623654	6,367864337	2.857452654	6,336351989	20.63453263
	17.82340994	13.02268984	17,64717904	30,84738122	1.103228692	6.780573609	16.01970787	23,95557184	10.9862251	14.8674075	18.18713638	20.03077128	1,659834641	34.01922951	8.791300555	3.409051258	1,889011302	15.19920754	1,456266641	3,252727167	1.92061982	1,15451555	19,8134058	11,69181426	25,63350539	18.88262313	23,18398426	17,2329505	23.18196775	14.95930266	24,36095954	25,65907432	19,34783059	27.22357679	22,53923803	4.871009817	6.360096869	3.602198976	16,5090439	22.8431745
	/8100//0078/	18,21813077	23.14775485	29,71153223	2.170422952	8.134132036	23.54804667	28,60251328	31,81602093	25,60885154	26.11670313	21.24725903	2.915638696	31,17761956	0.822603424	5,842616596	2,262871009	1,422616774	5.671175844	4.815478182	2.563557284	2.885924258	32.51612495	10.99922076	26,66604793	20,06886964	22.05043745	19.61886578	42.38607553	19,57872959	21.55396988	25,78662125	26.8056176	35.58329862	21,24727999	4.483573541	7.054388812	4.363727469	2.818134846	23,61171293
	20,2/131/65	16,00676831	23.82885337	29.78740203	1,582316414	9,362091141	30,76692002	24.1831519	27.65225851	22,81574164	24,41874925	23.15377588	3.035698537	34,10379475	0.895969739	3,982933258	2.176145649	1.034914616	5.030129846	4.829174413	2,039062485	2.220425329	31,39371467	11.96015041	30.64392285	21,82366631	23.63660096	20.27570383	48.60827655	20,63861132	23.07654727	28.36940167	25,43365191	37.04254749	24,30305591	3.927462453	7.511216326	3.254207402	8.583846144	20,27058268
	46.25990911	45.25023946	10.90999216	54.4411949	5,628362584	19.91483801	7,544837461	12,81248352	5,963530521	4,490066004	4,839655851	6,411666818	4,920009122	6,881790584	17,32422488	8.110370507	13,55485747	6.062776617	6.402438243	7,353607298	6,947984869	6.647332466	4,511434865	4.273131909	7,594364628	10,9035389	5,432221512	6.546527414	7.944255354	7.409517924	6,781838425	19.89513482	5,753462094	5.883142749	6.251234677	15.44668568	11,3197892	8,56845107	6.184780432	4.969815506
	53.82921611	47,57551429	11.12532179	62,25292659	6.401464348	22,7381159	9,605485934	12,4290971	7.785748508	6.288204512	4.880356596	8.479066808	6.500609214	9.421761776	5.216849242	7.838571107	4.956859017	5.404776773	7.546598009	8.715924875	8.015056524	5,486984016	6.299183956	5,705783899	10,76405611	10,62920807	7.632328468	8.677781639	8.45533271	9.817268292	8,501848685	13.45540044	6,462547598	9.194419114	8,135204655	19.72793582	14,26115078	9,345806882	8.290346893	5.829042051
	56.67674826	48,48335304	9,80585148	68,67343991	6.079126118	22.61556954	9.479217739	4.261155334	7,520608106	5.45251025	2.242032928	7,556753899	6,046321655	8.81000027	6,032584586	7,352959068	5.32000885	5.538922381	7.072922475	8.530732052	7,694076299	5,392872692	3.952137125	5.321094819	9.897803204	9.862860468	7.657564613	8.186637919	8.245173408	8.688270747	8.295025536	10.92456794	7,718106658	8.820264288	7,279906425	17.88437285	12.536771	9.115267349	12.09049918	5.209247321
	38,30704958	36,30704958	12.5238108	36.30704958	5,426867725	25,73740515	8.895662277	13.67326612	7.385166272	4.841559344	0.596223821	7,7721864	4,546705412	11.10935518	10,6998308	8,495460011	8,197656911	10,1148224	6.441469774	9.035104314	7.271360835	5.962252816	6,168419327	6.07446736	10.89267008	11.70702321	10.84632581	10,38317033	9,999757753	8.639728411	10.93854816	14,0563162	7,721500548	8,469029997	8,39191538	20.04539147	13,57703545	10.63654538	17,38713256	6,090353431
	39,02380655	37.01986341	9.124487788	37.61546462	5.067442981	15.24754038	7,311596005	7,555538142	6.874595041	4,640487592	4,50182924	6,544129951	5,024903	7.335298925	38,59262312	9,317433876	8,148565459	3.688421667	6.280975268	6,969251828	5.123406597	6.725228727	5,630223489	4,319668521	6.633631914	6.878383398	7.774740452	7.086629819	8.498379167	8,306766068	6,11454874	9.753283045	6,223320588	6,570558251	4.756724822	11,98813991	9.132344514	6.40710185	1.415297485	3,85972235
	_	60.1395528	10.27189646	72,81271834	5.476839239	23,02941313	8.022234644	12,69294864	6.632333815	6.089780613	4.965150621	7.125405927	5.803194729	7,384750912	5,486100802	6.998082782	7.215022797	6.616843406	6,981286958	10.53368867	7.777346527	6,200527631	4,739031812	4,587823085	8.710213419	10.88603107	6,175908969	6,28913391	6,978311765	8.511773188	6,333304604	12.01197758	6.121396479	8,489900146	7,600540659	18.0187463	11,81379838	10.07196453	8.374768147	5.417891216
	2D Marker oduli vs. Ielal	20 Marker adult vs. fetal	2D Markor adult va. fetal	2D Markor actuit vs. fetal	2D Marker eduit vs. fetal	20 Marker edult vs. (etal	20 Marker adult va. fetal	2D Marker ackel va. fetal	20 Marker edult vo. fetal	2D Markor ochult vo. fetal	2D Marker actuit vo, fetal	20 Marker actull va. fetal	20 Marker adult vs. letal	20 Markor edult vs. fetal	2D Marker adult vo. fetal	2D Marker adult vs. fetal	2D Marker adult vo. fetel	20 Marker adult vs. fetal	2D Marker adult va. fotal	2D Marker adult va. fetal	2D Marker actuil vs. fotal	20 Marker actult vs. fetal	2D Marker adult vs. fetal	2D Marker actuit va. fotal	2D Marker odull vs. fetal	2D Marker adult va, fotal	20 Markor actuit vs. fetal	2D Marker adult vs. fetal	2D Marker edult vs. fetal	2D Marker adult ve. fetal	2D Marker actuit vs. fetal	20 Marker adult va. fetal	2D Marker adult va. fetal	2D Marker odult va. tetal	2D Martor adult va. letal	2D Markor odult vs. fetal	2D Marker actuit vo. fetal	20 Marker actuit va, fotal	20 Marker actuit va. fotal	2D Marker actuit va. total
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	W73892	N70734	H57136	AA709414	W65461	AA436584	AA028042	AA427725	N51280	AA281347	AA402960	N98485	AA490209	W61361	N5101B	AA455281	W69471	AA486321	AA458982	AA442095	N99003	AA009284	AA195038	AA478268	AA608583	AA480435	AA505045	AA487893	. AA292226	H97106	W98450	NSSCO	AA405800	T51539	. N59764	AA521346	AA428551	AA489383	AA490172	AA504477